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## NOTICE OF ALLOWANCE AND FEE(S) DUE

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01/09/2007

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BURNSVILLE, MN 55337-2890

EXAMINER

STERRETT, JONATHAN G

ART UNIT

PAPER NUMBER

3623

DATE MAILED: 01/09/2007

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/915,029	07/25/2001	Guy W. Feldten	51430-00210	7044

TITLE OF INVENTION: TEST SCREENING OF VIDEOS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$0	\$0	\$1400	04/09/2007

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

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If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

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(Depositor's name)
(Signature)
(Date)

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09/915,029	07/25/2001	Guy W. Feldten	51430-00210	7044

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nonprovisional	NO	\$1400	\$0	\$0	\$1400	04/09/2007

EXAMINER	ART UNIT	CLASS-SUBCLASS
STERRETT, JONATHAN G	3623	705-010000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1	_____
2	_____
3	_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
- ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

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This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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EXAMINER

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## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

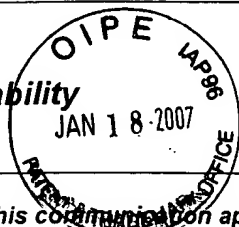
The Patent Term Adjustment to date is 962 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 962 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

# Notice of Allowability



Application No.

09/915,029

Examiner

Jonathan G. Sterrett

Applicant(s)

FELDTEN, GUY W.

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 9-21-06.
2. ☒ The allowed claim(s) is/are 1-9, 11-13 and 15-19.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

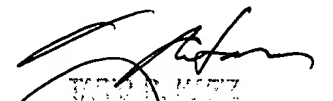
Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date 20061207.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
JAN 18 2007  
PATENT OFFICE



Examiner's Amendment

1. An examiner's amendment to the record is attached to the Office Action. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. William E Anderson II, Reg. 37,766 on 7 December 2006. See attached interview summary.

2. The abstract is amended as per below to reduce the word count to 150 words or less. The amended abstract is attached.

3. The specification is amended to add material removed from the abstract as per below:

On page 2, between the title "BRIEF SUMMARY OF THE INVENTION" and the first paragraph of the Summary, insert the following:

"The methods for facilitating video test screening on an electronic visual communications network have several steps. One is to establish a registrant database of persons who volunteer to serve as a member of a video test screening audience. That database contains the persons name and

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personal contact information and preferably also demographic information, plus the person's identification number called an ID number. Another main step is that of establishing a test screening audience database of test screening audience members for test screening a particular specific video. Audience members are selected without regard to the time a person was added to the registrant database, or in a sequence according to the time a person volunteered to serve as a member of a test screening audience for a particular specific video, or by a combination involving both techniques. Members of the test audience are given a special access code to be entered with the member's identification number in order to gain access to the particular specific test video for test screening on the network. Test screening may involve exposing an audience member to a verification code at some point in the video, and subsequent quizzing of the member to verify that the member viewed that portion of the video."

4. The claims below are the pending claims in the application.

1. (Currently Amended) In a method for facilitating video test screening on an electronic visual communications network, the steps comprising:

(i) establishing a registrant database of persons who volunteer to serve as a member of a test screening audience for video test screening on said network, said registrant database containing for each said person,

(a) the person's name and personal contact information, and

(b) the person's identification number called an ID number,

(ii) establishing a test screening audience database of test screening audience members for test screening a particular specific video,

(a) wherein said test screening audience members are selected from persons in said registrant database by a procedure involving one or more of the following techniques:

A. selection without regard to the time a person was added to said registrant database, and

B. sequential selection in the order in which a person volunteered to serve as a member of a test screening audience for said particular specific video, and

(b) wherein said test screening audience database is limited to members who accept assignment to them of a special access code to be entered by said member together with the member's identification number in order to gain access to the particular specific video for test screening on said network, and

(iii) conducting test screening of said particular specific video, wherein said particular specific video is a production or post-production videos ~~vides~~, on said network by steps involving

(a) entering by a test screening audience member his or her identification number and access code, to thereby obtain access by said test screening audience member to the particular specific video under screen testing,

(b) providing on-line responses by test screening audience members to questions about the video of the test screening, and

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(c) obtaining the on-line responses from the test screening audience member about the particular specific video after they have screened it and storing the responses

(d) obtaining prior commitments from the test screening audience members to watch the entire test video and ensuring that the test audience members watch the entire test video by displaying in the video under screen testing a verification code for a limited time without advance notice to any members of the test screening audience, and the step of quizzing members of the test screening audience about said verification code, to thereby learn if any member of the test screening audience failed to view a portion of the video containing the verification code.

2. (Original) In the method of claim 1, the additional step of publishing an announcement that any person desiring to serve as a member of a video test screening audience on said network should volunteer for such service.

3. (Previously Presented) In the method of claim 1, the additional step of conducting a post viewing discussion after the particular specific video is test screened.

4. (Original) In the method of claim 1, the further step of adding demographic information for persons in said registrant database.

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5. (Original) In the method of claim 4, the additional step of pre-establishing demographic requirements for said members of said test screening audience for said particular specific video, and wherein selection of said members of said test screening audience is from persons whose demographics satisfy said demographic requirements.

6. (Original) In the method of claim 5, the step of establishing, before establishing said test screening audience database, a selected candidate database composed of persons registered in said registrant database whose demographics satisfy said demographic requirements.

7. (Previously Presented) In the method of claim 6, the step of replacing persons in the selected candidate database with other persons from said registrant database whose demographics satisfy the demographic requirements pre-established for the test screening of said particular specific video whenever a person initially placed in said selected candidate database declines or fails to serve.

8. (Original) In the method of claim 1, the additional step of obtaining agreement by a volunteering person to abide by a set of pre-established conditions for video test screening before including such person in the registrant database.

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9. (Previously Presented) In the method of claim 1, the step of pre-determining a minimum number of persons to be included in said test screening audience database before establishing said database and using the minimum of persons in conducting the test screening.

10. (cancelled)

11. (Currently Amended) In a method for facilitating video test screening on an electronic visual communications network, the steps comprising:

(i) publishing an announcement that any person desiring to serve as a member of a video test screening audience on said network should volunteer for such service,

(ii) establishing a registrant database of persons who volunteer and are deemed potentially eligible to participate in video test screening on said network, said registrant database containing for each person in it,

(a) the persons name and personal contact information and demographic information, and

(b) the person's identification number called an ID number,

(iii) establishing, before forming a test screening audience database of test audience members for test screening a particular specific video, a selected candidate database composed of persons registered in said registrant database whose demographics satisfy the demographic requirements pre-established for members of a test screening audience for said particular specific video, said

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selected candidate database of persons being formed by a procedure involving one or more of the following techniques:

(a) selection without regard to the time a person was added to said registrant database, and

(b) sequential selection in the order in which a person volunteered to serve as a member of the test screening audience for said particular specific video,

(iv) establishing a test screening audience database of test screening audience members for test screening said particular specific video by selecting persons from said selected candidate database who accept assignment to them of a special access code to be entered by said member together with the member's identification number in order to gain access to the particular specific video for test screening on said network, and

(v) conducting test screening of said particular specific video, wherein said particular specific video is a production or post-production videos ~~vides~~, on said network by steps involving

(a) entering by a test screening audience member his or her identification number and access code, to thereby obtain access by test screening audience member to the particular specific video under screen testing,

(b) providing on-line responses by test audience members to questions about the video of the test screening, and

(c) tabulating the responses by test screening audience members into a report of the responses

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(d) obtaining prior commitments from the test screening audience members to watch the entire test video and ensuring that the test audience members watch the entire test video by displaying in the video under screen testing a verification code for a limited time without advance notice to any members of the test screening audience, and the step of quizzing members of the test screening audience about said verification code, to thereby learn if any member of the test screening audience failed to view a portion of the video containing the verification code.

12. (Original) In the method of claim 11, the additional step of obtaining agreement by a volunteering person to abide by a set of pre-established conditions for video test screening before including such person in the registrant database.

13. (Original) In the method of claim 11, the step of predetermining the number of persons to be included in said test screening audience database before establishing said database.

14. (Cancelled)

15. (Original) In the method of claim 11, the step of replacing persons in the selected candidate database with other persons from said registrant



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database whose demographics satisfy the demographic requirements pre-established for the test screening of said particular specific video whenever a person initially placed in said selected candidate database declines or fails to serve.

16. (Previously Presented) In the method of claim 1, wherein the particular specific video provided for the test screening audience members is provided regardless of their particular video interests or likes.

17. (Previously Presented) In the method of claim 1, wherein the questions about the video of the test screening include questions about specific aspects of the particular specific video.

18. (Previously Presented) In the method of claim 11, wherein the particular specific video provided for the test screening audience members is provided regardless of their particular video interests or likes.

19. (Previously Presented) In the method of claim 11, wherein the questions about the video of the test screening include questions about specific aspects of the particular specific video.

***Allowable Subject Matter***

5. **Claims 1-9, 11-13 and 15-19** are allowed.

***Reasons for Allowance***

6. The following is a statement of reasons for the indication of allowable subject matter:

None of the prior art of record, taken individually or in any combination, teach, inter alia,

establishing a registrant database of persons who volunteer to serve as a member of a test screening audience for video test screening on said network, said registrant database containing for each said person,

the person's name and personal contact information, and

the person's identification number called an ID number,

establishing a test screening audience database of test screening audience members for test screening a particular specific video,

where said test screening audience members are selected from persons in said registrant database by a procedure involving one or more of the following techniques:

selection without regard to the time a person was added to said registrant database, and

sequential selection in the order in which a person volunteered to serve as a member of a test screening audience for said particular specific video, and

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where said test screening audience database is limited to members who accept assignment to them of a special access code to be entered by the member together with the member's identification number to gain access to the particular specific video for test screening on the network, and

conducting test screening of said particular specific video, where said particular specific video is a production or post-production videos, on the network using the following steps:

entering by a test screening audience member his or her identification number and access code, to thereby access the video being screen testing,

providing on-line responses by test screening audience members to questions about the video of the test screening, and

obtaining the on-line responses from the test screening audience member about the particular specific video after they have screened it;

obtaining prior commitments from the test screening audience members to watch the entire test video and ensuring that the test audience members watch the entire test video by displaying in the video under screen testing a verification code for a limited time without advance notice to any members of the test screening audience, and the step of quizzing members of the test screening audience about said verification code, to thereby learn if any member of the test screening audience failed to view a portion of the video containing the verification code,

as recited in independent **Claims 1 and 11.**

The novelty of the invention is in the combination of the limitations cited in independent **Claims 1 and 11** and not in any specific individual claim limitation.

The prior art reference most closely resembling the applicants claimed invention is **Herz (U.S. Patent 6,088,722)**. Herz discloses some of the features of the claimed invention, as discussed below. For those features missing from Herz, an unreasonable number of references would be required, so that a person of ordinary skill in the art at the time of the invention would not have been motivated to combine Herz with the required references. Therefore a combination of these features was not reasonably found in the prior art.

While **Herz** discloses:

establishing a registrant database of persons who volunteer to serve as a member of a test screening audience for video test screening on said network, said registrant database containing for each said person the person's name and personal contact information, and the person's identification number called an ID number; establishing a test screening audience database of test screening audience members for test screening a particular specific video, where the test screening audience members are selected from persons in said registrant database by a procedure involving one more of the following techniques: selection without regard to the time a person was added to said registrant

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database, and sequential selection in the order in which a person volunteered to serve as member of test screening audience for said particular specific video; conducting test screening of said particular specific video on said network by steps involving entering by a test screening audience member his or her identification number, to thereby obtain access by said test screening audience member to the particular specific video under screen testing, and providing on-line responses by test screening audience members to questions about the video of the test screening, and obtaining the online responses from the test screening audience member about the particular specific video after they have screened it.

it lacks,

establishing a registrant database with the person's name and contact information and where the test screening audience database is limited to members who accept assignment to them of a special access code to be entered by said member together with the member's identification number in order to gain access to the particular specific video test screening on said network and conducting test screening of said particular specific video on said network by steps involving entry by a test screening audience member of his or her access code and customer ID, to obtain access by said test screening audience member to the particular specific video under screen testing, and obtaining prior commitment from the test screening audience member to watch the entire test video and ensuring that the test audience members watch the entire test video by displaying in the video under screen testing a verification code for a limited time without advance notice to any members of the test screening audience, and the

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step of quizzing members of the test screening audience about said verification code, to learn if any member of the test screening audience failed to view a portion of the video containing the verification code.

as recited in independent **Claims 1 and 11**.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Derks US 5093786 discloses a remote response system.

Ferris WO 99/04568 A1 discloses a remote control device for consumer broadcast receivers.

Abata EP 1089201 A1 discloses a video system utilizing user profile information.

Vamparys WO 200115449 A1 discloses a method for creating recommendations based on a users profile that is built interactively.

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8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan G. Sterrett whose telephone number is 571-272-6881. The examiner can normally be reached on 8-6.

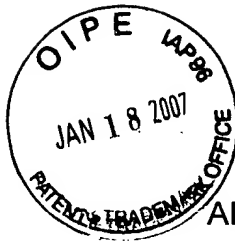
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tariq Hafiz can be reached on 571-272-6729.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JGS




12-07-2006

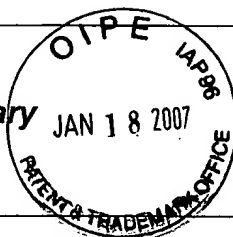


## ABSTRACT OF THE DISCLOSURE

The present invention is directed to methods for facilitating video test screening on an electronic visual communications network. One step is to establish a database for a video test screening audience. The database contains audience member information and ID numbers for the audience members. A further step is establishing a test screening audience database. Audience members are selected without regard to the time a person was added to the database, or in a sequence according to the time a person volunteered to serve, or by a combination involving both techniques. Members of the audience are given a special access code to be entered with the member's identification number in order to gain access to the test video for test screening on the network. Verification codes and quizzing of the members may also be used for viewing verification.

  
TARIQ R. NAZIR  
SUBSTANTIAL PATENT EXAMINER  
JAN 18 2007



**Interview Summary**

Application No.

09/915,029

Applicant(s)

FELDTEN, GUY W.

Examiner

Jonathan G. Sterrett

Art Unit

3623

All participants (applicant, applicant's representative, PTO personnel):

(1) Jonathan G. Sterrett.

(3) \_\_\_\_\_.

(2) William E Anderson Reg 37,766.

(4) \_\_\_\_\_.

Date of Interview: 07 December 2006.Type: a) ☒ Telephonic b) ☐ Video Conference  
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]Exhibit shown or demonstration conducted: d) ☐ Yes e) ☐ No.

If Yes, brief description: \_\_\_\_\_.

Claim(s) discussed: 1-19.

Identification of prior art discussed: \_\_\_\_\_.

Agreement with respect to the claims f) ☒ was reached. g) ☐ was not reached. h) ☐ N/A.Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Mr Anderson agreed to roll Claim 10 into 1 (and respectively, Claim 14 into 11) to make claims allowable (per the allowance panel feedback of 12-5-06).

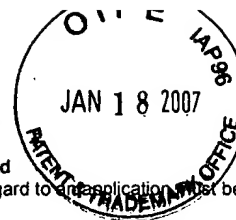
(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

  
Examiner's signature, if required

## Summary of Record of Interview Requirements



### Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

### Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

#### Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

#### 37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,  
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

### Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

<b>Notice of References Cited</b>	Application/Control No. 09/915,029	Applicant(s)/Patent Under Reexamination FELDTEN, GUY W.	
	Examiner Jonathan G. Sterrett	Art Unit 3623	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,093,786	03-1992	Derks, Harry G.	455/3.01
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

**FOREIGN PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N	WO 9904568 A1	01-1999	World Intellect	FERRIS et al.	
	O	WO 200115449 A1	03-2001	World Intellect	VAMPARYS, F	
	P	EP 1089201 A1	04-2001	European Patent	ABATO et al.	
	Q					
	R					
	S					
	T					

**NON-PATENT DOCUMENTS**

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



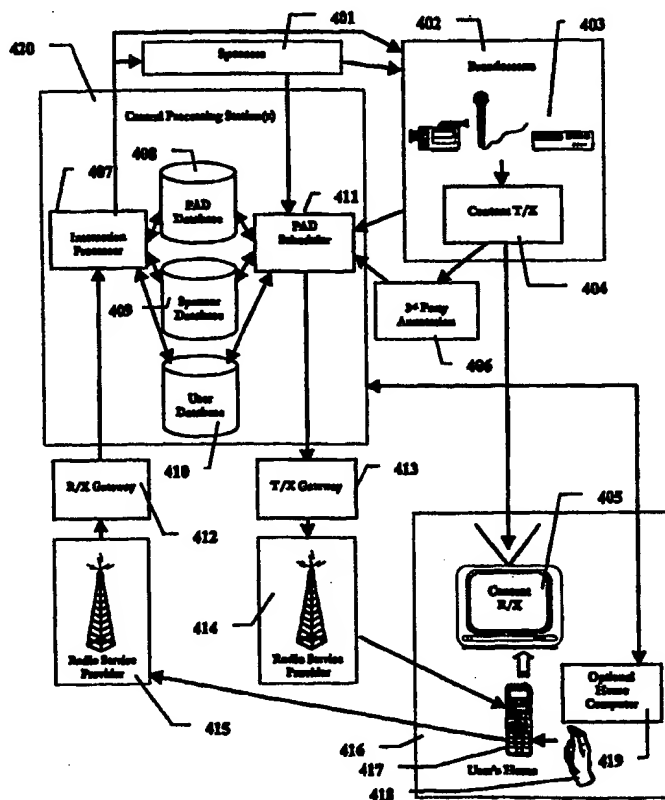
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>H04N 7/173</b>	<b>A1</b>	(11) International Publication Number: <b>WO 99/04568</b> (43) International Publication Date: <b>28 January 1999 (28.01.99)</b>
(21) International Application Number: <b>PCT/GB98/02152</b> (22) International Filing Date: <b>20 July 1998 (20.07.98)</b> (30) Priority Data: <b>9715228.4</b> <b>18 July 1997 (18.07.97)</b> <b>GB</b> (71) Applicant (for all designated States except US): <b>RADIOSCAPE LIMITED [GB/GB]; 34 Mornington Crescent, London NW1 7RE (GB).</b> (72) Inventors; and (75) Inventors/Applicants (for US only): <b>FERRIS, Gavin, Robert [GB/GB]; RadioScape Limited, 43 Mornington Crescent, London NW1 7RE (GB). FLORENCE, Peter, Charles [GB/GB]; RadioScape Limited, 34 Mornington Crescent, London NW1 7RE (GB).</b> (74) Agent: <b>WALDREN, Robin, Michael; Marks &amp; Clerk, 57-60 Lincoln's Inn Fields, London WC2A 3LS (GB).</b>	(81) Designated States: <b>CA, JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</b> Published With international search report.	

## (54) Title: COMMUNICATION SYSTEM AND METHOD

## (57) Abstract

A remote control device for consumer broadcast receivers, particularly television and radio receivers, is disclosed. In addition to the remote control features normally found on such a device, the device also contains a display on which advertisements, product and service offers, and other information (collectively, "display data") may be shown to the user. The device receives such display data via a radio link from one of a plurality of central processing stations. The user of the device may interact with such display data (for example, to purchase an advertised good), and the device may send back details of such interactions to a central processing station, which in turn may initiate a transaction with the appropriate sponsoring party.



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### Communication System and Method

The present invention relates to a communication system and method. The invention further relates to a transmitter apparatus and a receiver apparatus for use with the system and to a subscriber apparatus for communicating with at least one of the transmitter and receiver apparatus.

The invention may be applied to the field of remote control units for consumer broadcast receivers, including television and radio receivers. The invention relates to the display of (possibly programme-related) information, advertising, and product and service offers on said remote control units. The invention provides use of said units to allow consumer response to the said displays, particularly but not exclusively where said response involves the purchase of said products and services so offered.

It is commonly known in the advertising, sales and marketing arts that users are much more likely to initiate an impulse purchase of information, products and services (collectively, 'offerings') if :

- 1) they are induced to think about said offerings in a positive manner shortly prior to the offer of sale,
- 2) an offer of sale is, in fact, made and
- 3) it is fast and easy for users to place orders for such offerings, once the offer of sale has been made.

Broadcast media, such as television and radio, often satisfy the first condition for many offerings. For example, upon hearing a track from an album on the radio on the radio, a listener will commonly wish to purchase that album. Similarly, upon watching a cookery programme on television, a viewer may wish to purchase a bottle of wine

reviewed therein. Indeed, condition 1) forms a key premiss of many television shopping channels, infomercials and commercials in the United States and elsewhere.

Unfortunately, however, condition 2) is often unsatisfied, as, for example, when a radio station does not broadcast the name of the artist and album of the current song, or where (as in the cookery programme example) there is no provision to phone in orders (which is a costly enterprise for the broadcaster to maintain). Many commercial opportunities to make a sale are lost in this way.

Furthermore, even when 1) and 2) are satisfied (as with a television shopping channel), it is usually the case that 3) is not. Users who might initially be keen to purchase an offering become less so when such purchase involves location of a credit card, phoning up, waiting in an answering system, and then having to give a number of lengthy details. Lack of convenience acts as a strong barrier to sales.

Various solutions have been proposed in the art to the various problems of 1), 2) and 3). However, a good, economical solution has not yet been offered to all three.

U.S. Pat. No. 5,410,326 (Goldstein) describes the use of a universal remote control device with a built in display on which advertisements can be shown. The system does allow purchasing; however, this requires the use of a phone modem, which is highly inconvenient, and also, since the system connects directly to the sponsoring party, may require direct data handling for which that party is not equipped. Furthermore; downloading data into the device requires either the use of the said modem, a set-top box adaptor (to gain access to in-band or out-of-band Programme Associated Data (PAD)), an optical device to 'read' information off the television screen, or an audio device to detect information hidden in audio signals. The disadvantage of using the phone modem to download PAD is clear, in that a call must be made, which is inconvenient, and since there is both a limited memory in the device (limiting the amount of static information which can be downloaded) and occasions when the PAD will be highly volatile and not known ahead of time (as with sporting events), the

solution is not general. The disadvantages of using a set-top box, namely cost and complexity, are easily understood, as are the difficulties suffered by 'data-hiding' or visual indicia systems (low code rate, low reliability). Therefore, while this device has some promise, it must fall down in being manifest either as a workable but very expensive unit, or a mid-priced but less than useful one.

It is, accordingly, an object of the present invention to provide an economical channel for at least one of outgoing or incoming information, avoiding the disadvantages of the channels currently in use in the art, for the transmission of interaction data to or from the instant device.

According to a first aspect of the present invention, there is provided a communications apparatus comprising means for determining whether a broadcast receiver is receiving a particular channel, the apparatus further comprising receiving means for receiving a signal, means for displaying information in response to a signal received by the receiving means, means responsive to a user input to provide an outgoing signal and transmitting means for transmitting the outgoing signal, wherein at least one of the receiving means and the transmitting means is for communicating by radio with a remote station responsive to outgoing signals from a plurality of communications apparatus.

According to a second aspect of the present invention, there is provided a transmitter apparatus comprising means for storing information concerning transmission from a primary broadcaster, means for transmitting the information and means for synchronising the transmission of information to at least one transmission from the primary broadcaster, wherein the means for transmitting information transmits distinct from the primary broadcast chain.

Looking generally at the issue of presenting programme-related offerings to a user via an apparatus, one can see that there is a need to have an outbound channel, holding the programme-associated data, which is broadcast to the user in parallel with the



programme channel, and which is picked up by the said apparatus. However, as we have seen, current mechanisms for sending offering-related PAD requires that the data be sent in the same medium as the programme, which in turn requires either a costly set-top box decoder, an unreliable (and broadcaster-tied) 'data-hiding' decoder, or the duplication of the receiver circuitry in the receiver, which would also be very expensive. Broadcast of PAD using other channels either has significant drawbacks (as with the use of telephone channels, which are inconvenient, non-broadcast, and not amenable to 'real-time' PAD), or has not yet been applied to the distribution of offering-related PAD (as with the systems which use the pager network as a transport).

The present invention may further provide an offering-related PAD broadcast channel which can be received by a device without the use of a set-top box, telephonic modem, or other external inconveniences, and which does not rely upon to co-operation of anyone in the primary broadcast chain to insert information (whether using out-of-band, in-band, using data hiding or otherwise) into the programme broadcast medium.

Similarly, it may be appreciated that such a device, if it is to allow useful purchasing and information request actions by customers, must supply a (relatively low-capacity), real-time back (or return) channel, to allow interaction data to be conveyed to the sponsoring party. Such a back channel must be initiated on a individual basis, as opposed to the broadcast nature of the outbound channel. Existing systems rely on back-channel paths which are either inconvenient (for example, telephonic modems), require the use of a costly set-top unit (for example, those which exploit the cable system as a return path), or are not 'real time' or close to 'real time' (as with systems which must be taken to a 'downloading' point to extract any interaction data stored in them). Current systems also connect the back channel of the user's system directly to the sponsoring party, thereby requiring that the latter be equipped with whatever handling equipment may be necessary; another potential hurdle to take-up.

Notice that such a device, if it is to be generally useful, must be able to receive PAD items in an ongoing feed. There are two main reasons for this. First of all, the fact that

any reasonably-priced embodiment of such a device can have only a modest amount of onboard memory, places a limit on the number of PAD items that can be downloaded to it in any given batch mode transfer. Second, for certain events, such as televised live horse races, the outcome is not known in advance, and so neither, a fortiori, is the content of any event-related PAD. Such PAD cannot, therefore, be downloaded in advance of the event using a batch mode transfer.

These two factors, namely limited buffer memory in the device, and the dependence of certain PAD items on live events, means that the ongoing feed of PAD to the device must take place in "real time" or close to "real time". "Reel time" feed is required in the second scenario mentioned, where PAD content is contingent upon an event, the outcome of which is unknown until the time of broadcast. Once the event in question is determined (for example, a particular horse wins the race), the relevant PAD may be constructed and is then immediately due for presentation to interested users. Ideally, as little additional delay as possible is incurred from this point on; hence the term "real-time". Near "real-time" feed is required in the first scenario, where PAD items transmitted to the user device must be relevant to a primary broadcast within the near future, if buffer overflow in the device is to be avoided.

The present invention allows the passage of such data to sponsoring parties to be indirected via a central processing station and require only the use of standard, well-known protocols for any communication between said central processing station and said sponsoring parties.

The present invention may further allow the presentation to users – through a cost-effective, single device – of programme-associated data, particularly where such PAD constitutes an offering, and to allow the user to express interaction with the PAD through the device, particularly where such interaction consists of the purchase of said offerings.

The present invention may further allow such PAD to be 'real-time' or 'near real-time', and for the interaction data to be conveyed back to the sponsoring party in 'real-time' or 'near real-time'.

The present invention may further provide a solution to the problem of satisfying conditions 2) and 3) mentioned above, (given that condition 1) is already satisfied by the primary broadcast material), in the form of a simple user device, a plurality of which may be in operation at any time, remote adaptor station or stations, and methods.

In accordance with the aforementioned and other objects of the invention, a brief summary of the present invention is given. Some simplifications and omissions may be made in the following summary, which is intended to highlight and introduce some aspects of the present invention, but not to limit its scope. Detailed descriptions of a preferred and other exemplary embodiments adequate to allow those of ordinary skill in the art to make and use the inventive concepts will follow in later sections.

The present invention provides apparatus and method for providing simple, efficient and economic display of advertisements, product and service offers, and other information (collectively, 'display data') to the users of broadcast receivers, and is intended to have particular application where said display data is related to the programmes picked up by such receivers. The invention also provides apparatus and method for users, where applicable, to interact with said display data (for example, to order an offered product, or to request more information about an advertised good or service), and for the details of such interaction (collectively, 'interaction data') to be sent back to the sponsoring party for processing.

The apparatus, for example a remote control can determine whether a channel is selected on a broadcast receiver. In the case of a remote control this can be by way of selection by a user. A confirmation of the correct channel can be obtained by receiving a signal from the broadcast receiver, for example using a microphone and comparing the signal with a predetermined signal or a signal received at this apparatus.

However, the device may also contain a radio data receiver, which is used to pick up display data relevant to the programme that the user is currently watching (or listening to). The device is able to filter this incoming data according to the current <medium, channel> pair, which is known to the device.

Incoming display data is stored in memory within the said device until it becomes eligible for display. Generally, such data will be timed to become eligible for display at a point when the programme on the associated channel contains relevant content, (thereby satisfying condition 1) mentioned in the background section); in such a circumstance the display data may be termed programme associated data, or PAD, and the point in time of activation is known as the cue point. The list of PAD items and associated cue points, for each programme broadcast on a given channel (which can include infomercials and commercials, for our purposes) must be provided to a central PAD scheduler, either ahead of time, just in time, or some combination of both. The scheduler co-operates with a database system to hold this list, and, at the appropriate point (either ahead of or at the cue point), passes the next due PAD item, including its cueing information, through to a radio transmission system, which it then sends it to users' handsets, as rehearsed above.

When a PAD becomes eligible for display and is present in the memory of the said remote control device, it will be caused to be shown on the display of said device, possibly accompanied by certain event indications (such as an audible alarm or flashing lamp).

Various sorts of input signal may be utilized by such a device. For example, a serialized PAD software object may be sent, comprising a program, associated state, unique identifier (PADUID), relevant <medium, channel> specification, and a triggering (cueing) time specification. Control messages may also be sent, to cause PAD items buffered in any appropriate receiving device to be rescheduled, edited, deleted or otherwise manipulated. Simple trigger signals may be sent, to cause any

appropriate receiving device to perform some preset operation. Configuration information may be sent (including software updates for the main device operating routines). "Pure" data may also be sent, devoid of any executable content, such data to be interpreted (and possibly displayed) by software routines resident in any appropriate receiving device.

If the user desires (and the PAD is of a nature so to permit), s/he may interact with the display data by operating controls on the said device. Through this mechanism the user may traverse through a structure of displays, or modify state information associated therewith, under the control of a flow control program embedded in the display data. The user may also move backwards and forwards through the set of display data items which has been received (bounded by the size of the memory) if desired. If a user is particularly interested in a unit of display data, s/he may cause said unit to be stored in non-volatile memory on the said device, from where it may be retrieved by the user for processing at a later time. In normal circumstances, any given unit of display data is eventually evicted from the memory of the device by an incoming unit; this will happen whenever the display data memory is full and the given unit is deemed least eligible to be retained, under some appropriate metric.

User interactions with each unit of display data are stored, and the flow control program contained with each unit may specify at which point (if at all) such interaction data should be forwarded to the sponsor of the display data. When this point is reached, a radio data transmitter in the device is used to send the interaction data back, via a radio service provider, to the central processing station. Here, it is fed into an interaction processor, which is responsible for providing the appropriate response. This may involve initiating a transaction on behalf of the user, possibly via an Internet gateway to the appropriate sponsoring party, requesting that the sponsoring party send more information, logging the interaction in a user database, performing a financial transaction, or otherwise.

In response to the interaction data so transmitted, it is possible for the interaction processor to send back data for the individual consumption of the display data program that initiated the transmission of the interaction data in the first place. This mechanism may be used, for example, to confirm that an order has been received and will be processed.

The central processing station mentioned above may be part of a large network of such stations, which may be arranged in such a manner as to provide transparent 'fail-over' of the transactions of one processing stations to others.

When a transaction is performed using the handset, details of that transaction are stored in non-volatile memory, and a set of the most recent transactions may be displayed to the user on demand. A full record for each user is stored at the central processing station handling that user, and may be downloaded to the handset on demand.

From a user's perspective, the device allows an easy, cheap and hassle-free entry into the world of interactive broadcasting. Services which may be offered include programme-associated selling, schedule information, betting, advertisement follow-up, voting, competitions, audience demographic measurement, interactive story lines, and many others.

The present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a plan view of one embodiment of the remote control apparatus of the present invention;

FIGS. 2A through 2L show various exemplary displays of the embodiment of the remote control device of the present invention shown in FIG. 1;

FIG. 3 is a functional block diagram of an interactive system having a preferred embodiment of the present invention;

FIG. 4 is illustration of the embodiment of the remote control device of the present invention shown in FIG. 1, as it might be used to offer programme-associated goods; and

FIG. 5 is a functional block diagram showing the major components of one embodiment of the remote control device of the present invention. Only the major data flows are shown; minor control flows are not.

FIG. 6 is a plan view of an alternative embodiment of the present invention, as a "pass-through" adaptor that may be attached to an existing broadcast receiver remote control handset.

FIG. 7A is a plan view of another alternative embodiment of the present invention, as a device which passively detects the currently selected <medium, channel> pair, and which has no remote control functionality.

FIG. 7B is a plan view of another alternative embodiment of the present invention, as a more restricted form of the device disclosed in FIG. 7A, which relies on user input to set the current <medium, channel> pair.

FIG. 3 is a functional block diagram of an interactive broadcast system embodying the principles of the present invention. The system of FIG. 3 is intended to serve as an example and should not be construed as limiting the invention.

Broadcasters 402 generate content from a number of sources 403, depending on the broadcast medium in use. For example, a television broadcaster might utilise live feed from video cameras, and video played from tape, as primary sources. Commercial broadcasters will also have programmes and segments (such as infomercials and

commercials) provided by sponsors 401, for insertion. In the normal course of events this combined content stream is fed into a transmission mechanism 404 for broadcast to into a user's home 416 where the content carrier is acquired and the content reconstructed and displayed using a broadcast receiver 405. Said transmission mechanism may involve terrestrial radio-frequency broadcast, satellite radio-frequency broadcast, or wired or fibre optic cable transmission, or otherwise. The overall path and system, by means of which content is disseminated from broadcasters 402 to broadcast receivers 405 in users' homes 416, is termed the primary broadcast chain.

For the system of the instant invention to operate, as mentioned above, a rolling 'play list' is compiled for each broadcast channel, containing the PAD display data records and their respective cue points. This information is fed, whether well or only very shortly in advance of the earliest cue point in the segment of the rolling list passed at that time, to a PAD scheduler 411 at a central processing station 420. Such a list may be provided by any combination of the sponsors 401, the broadcasters 402, or by some third party 406 which annotates programmes, either as these programmes are broadcast or ahead of time. The use of third party annotation may be useful where a broadcaster does not wish, or is not correctly placed, to co-operate with the display of programme-associated information. There are a number of circumstances where this might be appropriate; for example, local advertising, advertising making use of products appearing in a feature film, betting on the outcome of events, such as sporting events, and so on. Furthermore, the circumstance may arise, where a sponsor, for example, has an advertisement produced, but does not know at which time such this advert will be shown. In such a case, the transmission signal of the broadcaster in question may be monitored to detect the said advertisement at which point any PAD for that advert may be instantly cued.

In one envisaged embodiment of such a monitoring system, each central processing station contains a database of various audio and/or video samples (supplied ahead of time) taken from the programmes (including advertisement and infomercials) which are to be augmented with data. A matching engine then continuously compares input from



the various broadcast channels with these samples, and uses a commonly known algorithm (such as a sliding-window, averaged, square-of-difference system with an activation threshold) to determine when a 'match' has occurred. Such a system may be utilised to determine that a piece of annotated content is being broadcast at a certain time on a particular <medium, channel> pair, which may in turn allow the scheduler to verify or regain its synchronisation lock for the PAD items for that content. Through the transmission of special control messages, PAD items already sent to user devices may be rescheduled or deleted, without the main body of the message having to be retransmitted.

The possibility of maintaining multiple, alternative lists of PAD items for a given <medium, channel> pair is acknowledged here, with selection of the appropriate list or lists at the user device; however, the primary focus in this exposition will be for the simpler case of a single 'cue list' per pair.

When the next display message is due to be transmitted, as may be detected at the PAD scheduler 411 using either a polling or, preferably, an interrupt mechanism, it is retrieved from a PAD database 408, given a unique identification number (PADUID), and sent to a transmission gateway 413, which may be physically remote, where it is translated into the correct format to be sent over a radio transmission service 414. In the preferred embodiment of the present invention, the PAD would be sent using the text message transmission protocols of a cellular paging system, with a virtual 'recipient address' identified with the pair consisting of the medium and content broadcast channel in question, but other formats are obviously possible. For example, the outbound PAD could be transmitted using 'data-hiding' technology over an existing radio broadcast channel, or sent on a dedicated data radio channel, or otherwise.

From the gateway, the radio service provider 414 arranges for the transmission of the information over the service 414. In the preferred embodiment this involves sending the message using a cellular network of paging transmitters.

The message is received in a given user's home 416 by receiving apparatus 417, which in the preferred embodiment, is a remote control device for said broadcast receiver 405. In the preferred embodiment, the said remote control device 417 will contain a two-way paging chipset to allow reception and transmission of digital information in a ubiquitous and cost-efficient manner. The user 418 utilises the remote control device 417 to select the channel to receive at any given time on a given broadcast receiver 405, and this allows the device 417 to select the appropriate stream of incoming PAD items. In the preferred embodiment, the selected channel and receiver uniquely specify a virtual 'paging user id' to which the said two-way pager chipset may be set to be responsive.

In an alternative envisaged embodiment, data is transmitted to the device using a radio subcarrier scheme, such as is provided by the SCA system in the United States. In another envisaged embodiment, the data transport mechanisms of the Digital Audio Broadcasting (DAB) system are used to transmit information to the device (as defined in ETS 300 401 - "Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to Mobile, Portable and Fixed Receivers").

The internal configuration of the remote control device 417 will be described later. For now, simply note that the device 417 will display the incoming PAD display data to the user at the appropriate cue point, and may accept interaction from the user on the basis of the information so displayed. Details of such interaction, where relevant, may be transmitted back to the central control station 420, together with the unique handset/user id (HUUID) and PADUID of the initial display data. In the preferred embodiment, encoding and transmission is performed by a two-way paging chipset in the remote control device, and picked up by the local cell receiver of a co-operating paging service operator. However, other arrangements for reception of the return radio signal are possible.

For example, the system may make use of bandwidth available within a digital cellular telephony system, under some appropriate protocol (e.g. the Short Message Service of

GSM). Alternatively, the signal may be sent into an unlicensed radio data network, for example, a metropolitan packet-relay system.

In any event, the return signal is picked up by the receiver network 415 of a radio service provider (which may or may not be the same as provider 414), and forwarded to a reception gateway 412. This gateway formats the interaction data in a manner suitable for processing by the rest of the system, and arranges for the translated message to be transported to the appropriate central processing site 420, which may be physically remote.

At the central processing site, the forwarded message is received by an interaction processor 407, which decodes and processes the interaction data. It makes use of the PAD database 408, in conjunction with the enclosed PADUID. The enclosed HUUID is used to look up the user's record in a user database 410. Security mechanisms are incorporated into the message sent from the handset 417 to prevent fraud.

There are a number of possible operations available to the interaction processor upon receipt of a message, and the use of a plug-in architecture here allows this set to be extended at will. Indeed, a separate handler may be registered for each PAD, if desired. In any event, certain common actions will be possible. For example, the user's credit card details may be held in the user database 410 (indeed, if the remote control device is sold to the user by credit card, then this information will be immediately available after the sale), and used, in conjunction with the offer details from the PAD database 408 and vendor details from the vendor database 409 to formulate a financial transaction request, which may then be forwarded to the sponsoring party in question 401. This forwarding may utilise such transports and protocols as are known in the art, and may interface to existing systems installed by the sponsor; for example, the request might be sent over the Internet, using the Secure Electronic Transactions (SET) protocol. Alternatively, the interaction might constitute a request for further information, in which case the sponsor will be so informed. Here, a convenient format may be a 'virtual hit' on the sponsor's Internet Web site, suitably tagged so that the sponsor is aware of

the mechanism through which the interest has been channelled. In yet another common transaction, details are passed back to broadcasters 402, allowing the production of genuinely interactive broadcasts – for example, by allowing feedback voting on a talent contest, or program story line selection.

Through use of an optional home computer 419 connected to the appropriate central processing station 420 over a known transport, such as the Internet, users will be able to review the transaction histories held in the database 410, and have access to all the facilities offered by the handset 417, but in greater detail and with full graphical support. It should be noted that use of a home computer 419 is not necessary to the operation in the main of the present invention.

As the user's name and address is held in the user database 410, the process of purchasing, or requesting the mail-out of information, is greatly simplified.

FIG. 5 is a functional block diagram of an embodiment of the remote control handset according to the instant invention, and FIG. 1 is a plan view of one embodiment of such a handset.

Turning first to FIG. 5, we see that the user of the handset provides input to the device via input system 622, which in one preferred embodiment consists of a set of keys. This input is supplied to the core of a conventional remote control system, 614. This core system may be of any of the configurations well known and rehearsed in the art, such as vendor-specific, universal, learning, programmable, or otherwise. It consists of an input controller, which decodes the data from said input system 622, and invokes the appropriate response in the remote control driver 612. This driver will contain such means, well known in the art (e.g., ROM lookup tables, non-volatile RAM for 'learnt' configurations, etc.), as are necessary for the operation of the device as a remote controller of the required type, and will be connected to infra-red transmitter 613. This will provide an infra-red signal 615, coded appropriately by 612 in response to the user

input from input system 622 as detected by the input controller 611, which, in turn, will drive the remote consumer device (such as a broadcast receiver, VCR, etc).

Depending on the type of remote control device desired, various optional modules may be added to the remote control core 614. For example, a 'learning' remote control would need to have an infra-red receiver 617 connected to the driver 612, in order that inbound infra-red signals 616 from (e.g.) a target handset could be recorded. Similarly, a 'programmable' remote control may require a communications system 628 to allow the appropriate vendor-specific codes to be downloaded from a remote site upon request. According to one preferred embodiment of the present invention, this functionality of system 628 may be provided as a secondary function of the radio data transceiver 603 (described below).

As well as feeding the driver 612 via output 623, the input controller 611 also passes details of the invoked commands to the main processing system 604 within the handset via output 624. This processing system is responsible for dealing with the reception, storage and display of incoming display data, and also handling any interaction with said display data from the user, including (where necessary) causing any resulting interaction data to be transmitted back to the central control system 420.

The main processing system 604 contains a microprocessor 607 (which executes the software components of the user-side system), a real-time clock 626 used to determine (inter alia) when the cueing point of PAD items has been reached, a watchdog timer 629 to reset the system should it become locked up for whatever reason, and various memory components. The latter may be split into: workspace random access memory (RAM) 608, used to hold the ephemeral running state of programs executing on the microprocessor 607, non-volatile RAM 609 used to hold configuration information which must not be lost upon power loss (such as, possibly, HUUID information, purchase records, display data that the user has requested be stored, and possibly system software or patches), and finally, read-only non-volatile memory (ROM) 610, used to store non-changing information in the system, such as core system software routines.

According to one embodiment of the current system, the functions of all or part of the entire system 604 are provided by an appropriately chosen microcontroller, to reduce cost.

According to another embodiment of the current system, either or both the input controller 611 and the remote control driver 612 are provided by the said microcontroller also, to reduce cost.

The software running on the microprocessor 607 has the responsibility of storing display data pertaining to the currently selected channel of the currently selected broadcast receiver. The microprocessor 607 knows which is the currently selected channel, because it monitors the data 624 sent from the input controller 611; when a channel change is detected, the new <medium, channel> pair is stored in the non-volatile RAM 609. The system software is so arranged that, as soon as may be practicable after the user switches on a broadcast receiver using the device, the microprocessor sends an output along the bus 624 to the input controller 611, to force the transmission of an appropriate infra-red code to the said receiver, to force the selection of a known starting channel.

During operation, the microprocessor 607 may obtain extra information and confirmation about the current <medium, channel> pair, through the optional additional channel confirmation system 625. According to one embodiment of the current invention, this is provided by a microphone and analogue-to-digital (A to D) converter, together with a system which periodically receives a set of expected amplitude value ratings for each <medium, channel> pair from the radio transceiver system 603, and provides a running best match between these using such value-set correlation mechanisms as are well known in the art, such as a sliding-window, averaged, square-of-difference system with an activation threshold.

The currently selected <medium, channel> pair affects what information is accepted by the microprocessor from the radio transceiver system 603. According to the preferred embodiment, this will involve sending a control instruction to the pager reception circuitry to make it sensitive only to messages with the appropriate 'virtual' pager user id, corresponding to the said pair.

The radio transceiver system 603 is the main method by which the device communicates with the appropriate central processing station 420, as discussed above. Inbound messages, transmitted as radio signals 618, are picked up by the radio data receiver 601, which functionality in the preferred embodiment will be provided by the reception portions of a two-way pager chipset. Said messages are then passed through the message security system 627, to ensure that they are legitimate. In one embodiment, this process involves decrypting said inbound messages according to a public key algorithm. In another embodiment, it involves comparing a stated checksum on said inbound messages with the same checksum computed dynamically.

Any messages which are picked up and successfully validated by the radio transceiver system 603 are fed to the microprocessor 607, where their <medium, channel> pair is checked against that stored in the non-volatile RAM 609. Those messages which do not match are discarded, whereas those which do match are placed into a buffer in the workspace RAM 608. This buffer clearly has a limited size, and, when the buffer is full and a new message comes in, the PAD item (message) in the buffer with the cue point furthest away from the current time is discarded. Where possible, items which have interactive data stored are not discarded until either a timeout period elapses or the transaction is completed (in which case a summary may be written to the non-volatile RAM 609, and the item discarded if necessary). In the case of a tie, one PAD item is discarded at random. PAD items in the buffer are held in order of cue-up time.

In an envisaged extension to the system, sufficient memory is provided that PAD items for a number of <medium, channel> pairs may be accumulated, not merely the currently selected pair, allowing for information to be instantly available even when the

user skips to a new <medium, channel> pair. The device may keep a record of the most commonly accessed <medium, channel> pairs in non-volatile RAM 609, to help decide upon which PAD items to record.

Each inbound message carries a timestamp which is set at transmission; this allows the real time clock 626 to be accurately maintained in synchronisation by the processor. When the device is used for the first time, messages for any <medium, channel> pair are accepted, in order to quickly acquire an accurate timestamp to initialise the real time clock 626; however, said messages are not retained or displayed unless they do match the current pair.

In another envisaged extension to the system, PAD items contain additional descriptive information - metadata - which allows them to be selectively retained and displayed according to the profile of each particular user. This profile, which may be held in the non-volatile RAM 609, may be used to match PAD to users on criteria such as age, sex, geographical location, and so on.

In yet another envisaged extension to the system, the profiles of users are held, and may to some extent be generated, at the central processing site (420 in FIG. 3). These profiles, stored in the user database (410 in FIG. 3) are matched against metadata-tagged PAD items in the PAD database (408 in FIG. 3). A matching list of users is compiled, and this information (in the form of unique user ids) is appended to the appropriate PAD items prior to transmission. Upon reception at a device, the currently active user id is matched against the said list of users, and only those PAD items which do match are retained and displayed.

Special control messages may also be used, which will force the message corresponding to a specified PADUID to be flushed from the memory of receiving devices, or undergo modification of various types, including change of cue-up time.



The cue point for each PAD item is also specified as a real time point, with an optional special case of 'display immediately' which may be relevant in certain circumstances. The system does not require that PAD items be transmitted from the control centre in the order that they are to be displayed, since this is controlled by the aforementioned cue-up point.

The microprocessor 607 is responsible for initiating a display routine for each PAD item as its cue-up point is reached by the real time clock 626. It will detect such an event either through the use of an interrupt created by the real time clock 626, or by continuous polling. The former mechanism is to be preferred where possible. It may also invoke additional output systems 621 to attract the user's attention to the new display data. In the preferred embodiment of the current invention, such additional output systems will include a piezoelectric buzzer, and a flashing LED. The user may disable these systems if so desired.

The display routine executes the program unit associated with the appropriate PAD item. (In this sense, we may regard the display data as being an object, on which a 'display' method is invoked.) This program unit may make use of a set of core library routines stored in either or both of the ROM 610 and non-volatile RAM 609, to assist its operation. The microprocessor executes display routines using a pre-emptive strategy, to prevent the device becoming locked up due to an endless loop bug in such a routine. The watchdog timer 629 will reset the microprocessor should a bug in the display routine (or some other problem) cause the system to lock up.

To actually generate a display on the device, the display routine of the active PAD item may call various utility library routines, which cause the microprocessor 607 to issue commands to the display system 605. This system contains a display controller 620, responsible for translating the high-level commands sent from the microprocessor 607 into whatever low level display control signals may be required by the actual display system involved 606. In the preferred embodiment of the current invention, the display is rendered as a multi-line pixel-addressed LCD screen.

Other library routines available to an executing display routine provide (inter alia) read and write access to the various memory stores (608, 609 and 610) of the device, allow data to be passed to the input controller 611 via the bus 624, and allow messages to be sent back to the main control centre (and so, possibly, to a sponsoring party, a broadcaster, or otherwise). This latter functionality causes information to be sent to the radio data transmitter 602 of the radio transceiver system 603, having first passed through the message security system 627. According to the preferred embodiment of the current invention, this will involve providing at least a checksum for non-critical outgoing messages, and public-key encryption for critical messages, together with a message digest generated using a special key which makes use, in cyclical series, of a unique list of values held within the non-volatile RAM 609 of the device installed at manufacture and modifiable at later times. Messages are sent from the device using radio emissions 619.

Routines will also exist to allow the display routine to receive information back from the appropriate main control centre in response to a message sent; this cyclical process may continue for as long as necessary. Using further library routines, a display routine may notify the system that the user's interaction has reached a logical ending point, which will allow the PAD item to be flushed if required.

Turning now to FIG. 6, we can see an alternative embodiment of the current invention in which an adaptor unit 701, providing the facilities of the interactive set of controls (3 on FIG. 1) found on the preferred embodiment discussed earlier, can fit over a user's existing remote control unit 704. The "host" handset 704 contains, inter alia, an infra-red transmitter 703, which emits control signals 705 in response to user input. The adaptor unit 701 is so designed that the emitted signals 705 are passed through and permitted to emit from window 702 as signals 706. However, the device 701 also contains an infra-red receiver, which samples the signal 705, allowing the unit to identify the control signal which is being sent. When the control signal represents a command to change the current <medium, channel> pair, the device 701 switches its

PAD display and reception accordingly. The adaptor and host handset are shown in "exploded" form in FIG. 6; in normal use they would be joined together 706.

Turning now to FIG. 1, we can see the controls that would commonly be present on an embodiment of the remote control handset 1 according to the present invention.

The handset controls are split into two major groups. The first set 2 contains controls that are commonly found on conventional remote control devices, and the second set 3 contains controls specific to the interactive and innovative features of the current invention. Commands generated by the device are sent through as infra-red code sequences through the window 17.

Keypad 4 allows for the selection of channels as desired on the current broadcast receiver device, which in turn may be chosen using the keys 8. Controls 5 allow cycling through channels, and level-set controls 6 provide a means to adjust volume, brightness etc. Finally, there is a subset of other controls 7 which perform various functions, such as turning the target broadcast receiver on and off, muting the device, and so on.

In the set of interactive controls 3, we have a multi-line, pixel addressed LCD display 14 on which display data may be shown. Controls 13 and 15 may be exercised to invoke options shown on the screen, at the bottom and sides respectively. For example, in the configuration shown in FIG. 1, pressing the third triangular button from the left would cause the number of items ordered to increment by 1.

Users may traverse through the set of display data in memory using the forward and back keys 12. Newly displayed PAD items may be announced through the use of a piezoelectric buzzer 11 and a flashing LED 10. The 'lock' button 16, if pressed, removes purchasing authority from the handset until the user re-enters his or her PIN code. The 'Buy Now!' button 9 acts as a confirmation button for the current screen. Where no entry has been made on a screen, pressing button 9 will select the default values, if any.

Pressing some combination of keys (such as any two of 15, for example) will bring up a main, master menu allowing navigation to various subscreens.

FIG. 4 illustrates a simple example of an embodiment of the handset remote control device 502 of the present invention in use. Broadcast receiver 501 is displaying a television programme – “The Tool Show” – and as the presenter starts to demonstrate the use of good drilling technique 503, the handset 502 displays a programme-related offer 504 for the drill that the presenter is using. The PAD item corresponding to this offer will have been downloaded to the device from the relevant central processing station 420 (Figure 3) at some point previously, and cued up at the appropriate point for display by the mechanisms rehearsed above.

In order that a better understanding of some of the uses of the handset remote control device of the present invention may be appreciated, some exemplary displays from one embodiment shall now be considered, with reference to FIGS. 2A through 2L. These displays are intended as illustration only and should not be interpreted as limiting the invention.

FIG. 2A illustrates the offer screen of the example from FIG. 4, after some interaction. Line 101 contains a brief description of the product, and line 103 gives pricing information. Indicia 102 shows that there are currently 3 PAD items in memory for the current <medium, channel> pair, of which the currently displayed item is the second. Lines 104 give brief information about the current order and the total cost of that order if actually purchased. Below this are indicators of the functions for the variant selector buttons below (13 on FIG. 1). The ‘BUY’ button 105 will initiate a purchase (similar to pressing the ‘BUY NOW!’ button, 9 on FIG. 1). The ‘INFO’ button 106 will bring up a screen giving further information about the offered product. The variable function buttons corresponding to the ‘+1’ and ‘-1’ labels (107 and 108, respectively) increase and decrease the number of units of the product ordered.

If the user opts to buy, then the screen of FIG. 2C is shown, which contains a request to confirm the transaction 114, a selection of credit and/or debit cards 113 to choose from (chosen by pressing one of the side variable function buttons, 15 on FIG. 1), and the option to cancel the transaction 117. Selecting a credit card will bring up a 'successful order' screen, not shown here.

The screen of FIG. 2B is an example of an offer of information, which might be timed to run alongside an advertisement appearing on the complementary primary broadcast. Here, the user is prompted 109, 111, 112 to press the third from left bottom variable function button (13 on FIG. 1), which will cause a message to be sent back to the sponsor, who will then have the details necessary to send the user an information pack about the product 110. Pressing the 'BUY NOW!' button (9 on FIG. 1) will also have this effect, since it selects the default action on each screen. Once again, we see that the PAD item displayed is one of several 102 (in this case, the last of 4).

Another use of the system is for interactive voting on broadcast content, and FIG. 2D shows how the display might look when this feature is in use. Here, the user is prompted 116 to enter his/her vote for one of the acts 115 (in a talent show, for example), by pressing one of the side variable function buttons (15 on FIG. 1).

Figure 2E illustrates a simple channel guide for the currently selected <medium, channel> pair. A short listing of programmes for the current pair, together with start times, is given 216. A cursor 203 may be scrolled up and down the list using the bottom variable function buttons (13 on FIG. 1) corresponding to 206 and 205 respectively; and it is possible to have a list longer than the screen of which a window is displayed during scrolling, in the familiar manner. Indicia 201 shows the programme currently being broadcast. The current time 202 is shown, along with an indication of the current <medium, channel> pair 215 (in this case, the third channel on a television tuner is selected). The currently selected programme may have further information available about it, in which case label 204 will appear, and the bottom variable function button corresponding to it (from 13 on FIG. 1) may be pressed.

If this is done, a screen such as illustrated in FIG. 2F is displayed. In this instance, information about the selected programme is given 207, and, where this is longer than the screen, the user may scroll up and down through it using the bottom variable function buttons corresponding to labels 209 and 210, respectively. (Note that, in all cases of scrolling, the bottom line containing the function labels remains static). The current time 102 is also shown.

FIG. 2G illustrates how the system may be used as a betting terminal, where the details of the event so bet upon may be broadcast on the currently selected <medium, channel> pair. Here, a simple horse racing screen is shown. The user is prompted to select place a bet and told of the time available so to do 212. Various horses 211 may be selected by pressing the appropriate side variable function button (15 on FIG. 1). Note that this is a simplified example, and in reality, such a system would deal with setting the wager, displaying more information, including a larger number of potential candidates, etc.

When the handset is locked for purchase, by pressing the 'LOCK' button (16 on FIG. 1) or otherwise, the screen shown in FIG. 2H is displayed when a purchase is attempted. Here, the user is prompted 213 to enter a four-digit PIN 214, which will unlock the device. The device may be set to automatically lock if unused for more than a certain period of time. The PIN will be entered using the keypad (4 on FIG. 1).

If the handset is powered down or left unused for a significant period of time, it will revert to a mode in which the user identity must be set, as illustrated in FIG. 2K. Here, the handset has three users within a household 308, Mary, Mike, and Robert. The user is prompted to select his or her identity 309 by pressing the corresponding side variable function button (15 in FIG. 1). Once a user is selected, screen 2H may be displayed for verification. The handset device may utilise a capacitive switch to detect handling and initiate the power on cycle.

In FIG. 7A, we see an alternative embodiment of the current invention, in which no remote control functionality is present. Here, a portable device 801, providing the facilities of the interactive set of controls (3 on FIG. 1) found on the preferred embodiment discussed earlier, and which may also provide conventional pager functionality, contains a microphone 802 by which it continuously monitors its surrounding audio environment. Under normal viewing or listening circumstances, the audio input 803 to microphone 802 will contain a large component due to the programme currently being broadcast on the current <medium, channel> pair.

Having taken a series of audio observations across a short time window, the device performs a sliding match against a set of audio "fingerprints" (which are in turn received periodically from the appropriate central processing station (420 in FIG. 3) via radio link). The matching may use any of the value-series comparison metrics as are known in the art, such as least difference squared summation. If this process yields a unique match to a "fingerprint" of a <medium, channel> pair with sufficient confidence, then that pair will be used to control the current display and acceptance of PAD by the device.

FIG. 7B shows another alternative embodiment of the current invention, in which a portable device 804, similar in most respects to the device of FIG. 7A just considered, requires user input to select the current <medium, channel> pair. The user may cause the device to show display 811, in which s/he is prompted to enter the currently selected medium 809 and channel 810. To perform this selection, the user may move the selection cursors using the variable function buttons corresponding to the "medium" up and down and "channel" up and down labels (805, 806, 808 and 807 respectively). The selected pair is subsequently used to control the display and acceptance of PAD by the device, but does not cause the emission of control signals to a broadcast receiver.

The system may be used with a number of different types of broadcast receiver, and FIG. 2I shows the sort of display that might be shown to accompany radio broadcasts. Details of the current station are shown 301, and an indication of the receiver type 312.

Brief details of the currently playing song, together with the current time, are given 303. As before, a number of PAD items may be held in memory, and the position of the currently displayed item is shown 302. By pressing the bottom variant function key (13 in FIG. 1) corresponding to the 'INFO' label 304, the user may bring up another screen with more information about the current track (not shown here). Pressing the button corresponding to the 'BUY' label 305, or pressing the 'BUY NOW!' button (9 on FIG. 1) will initiate a purchase of the album or single currently playing. In this case, the user will be prompted with further confirmation screens (not shown in detail here).

FIGS. 2J and 2L are given to illustrate some other potential uses of the device, less directly connected with programme-associated material. In FIG. 2J the user is prompted 306 to enter a package tracking code 307 (as used by some document and parcel delivery companies), which may then initiate a remote query to display to the user the current location of the specified package (using screens not shown). Similarly, FIG. 2L illustrates a 'shop from home' usage, in which the user is prompted 310 to enter a joint product/vendor identification code 311. This will initiate a remote query to display information about the product so identified, in a manner similar to that used by PAD product offers (as shown in FIG. 2A, for example); if this is successful the user may initiate a purchase, as with the PAD example discussed previously. In both cases, the details would be entered via the keypad (4 in FIG. 1).

Although illustrative embodiments of the present invention have been described in detail with reference to the accompanying drawings, it is to be understood that the invention is not limited to those precise embodiments and that changes and modifications may be made by those skilled in the art without departing from the scope and spirit of the invention.

Moreover, any application or patent cited herein should be considered to be incorporated by reference as to any subject matter deemed essential to the present disclosure.



**CLAIMS:**

1. A communications apparatus comprising means for determining whether a broadcast receiver is receiving a particular channel, the apparatus further comprising receiving means for receiving a signal, means for displaying information in response to a signal received by the receiving means, means responsive to a user input to provide an outgoing signal and transmitting means for transmitting the outgoing signal, wherein at least one of the receiving means and the transmitting means is for communicating by radio with a remote station responsive to outgoing signals from a plurality of communications apparatus.
2. Apparatus as claimed in claim 1, wherein the remote station is distinct from a primary station providing signals to a broadcast receiver.
3. Apparatus as claimed in claim 2, wherein the at least one of the receiving means and transmitting means for communicating with a remote station comprises a means for communicating with a station in a cell of a multi-cell communication system.
4. An apparatus as claimed in claim 3, wherein the multi-cell communication system comprises a paging system.
5. An apparatus as claimed in any one of claims 1 to 4, wherein the means for transmitting the outgoing signal is arranged to transmit the outgoing signal as soon as a user input is complete.
6. An apparatus as claimed in any one of claims 1 to 5, wherein the means for receiving a signal is arranged to receive a signal from a broadcast receiver.
7. An apparatus as claimed in any one of the claims 1 to 6, wherein the means for displaying information is arranged to display information immediately in response to a signal received by the receiving means.

8. An apparatus as claimed in any one of claims 1 to 6, further comprising means for storing a signal received by the receiving means.
9. An apparatus as claimed in claim 8, further comprising time comparison means for controlling display of information in response to a stored signal at a predetermined time.
10. An apparatus as claimed in any one of the claims 1 to 9, wherein the apparatus is portable.
11. An apparatus as claimed in claim 10, wherein the apparatus is a remote control.
12. An apparatus as claimed in claim 11, wherein at least one of the receiving means and the means for displaying information is responsive to alter the information displayed in response to a channel selected using the remote control.
13. An apparatus as claimed in any one of the claims 1 to 9, wherein the means for determining whether a broadcast receiver is receiving a particular channel comprises means for receiving a signal from the broadcast receiver, and means for comparing this signal with a signal received from the receiving means.
14. An apparatus as claimed in any one of the claims 1 to 9, wherein the means for determining whether a broadcast receiver is receiving a particular channel comprises means for receiving a signal from a remote control.
15. An apparatus as claimed in any one of the claims 1 to 14, wherein the means for displaying information is further responsive to the user input.
16. An apparatus as claimed in any one of the claims 1 to 15, wherein the transmitting means is arranged to transmit an encoded authorisation signal.

17. An apparatus as claimed in claims 1 to 16, further comprising security means responsive to a predetermined user input for preventing the transmission of at least part of an outbound signal if the predetermined user input is not correctly provided.
18. An apparatus as claimed in claim 17, wherein the at least part of an outbound signal is the encoded authorisation signal.
19. An apparatus as claimed in claim 14 or claim 15, wherein the security means is responsive to a plurality of different predetermined user inputs.
20. A transmitter apparatus comprising means for storing information concerning transmission from a primary broadcaster, means for transmitting the information and means for synchronising the transmission of information to at least one transmission from the primary broadcaster, wherein the means for transmitting information transmits distinct from the primary broadcast chain.
21. An apparatus as claimed in claim 20, wherein the means for storing the information includes means for storing timing data associated with the information and the means for synchronising the transmission of information is responsive to the stored timing data.
22. An apparatus as claimed in claim 21, wherein the means for synchronising the transmission of information controls the means for transmitting the information to transmit the information before an intended time for display, and to transmit cueing information.
23. An apparatus as claimed in claim 20, further comprising means for receiving a signal from the primary broadcaster, wherein the means for synchronising the transmission of information is responsive to at least one portion of the signal from the primary broadcaster.

24. An apparatus as claimed in any one of the claims 20 to 23, wherein the means for transmitting information comprises a multi-cell communications system..
25. An apparatus as claimed in claim 20, wherein the multi-cell communications system comprises a cellular paging system.
26. A communication system comprising:  
transmitter apparatus comprising means for storing information concerning transmission from a primary broadcaster, means for transmitting the information and means for synchronising the transmission of information to at least one transmission from the primary broadcaster, wherein the means for transmitting information transmits distinct from the primary broadcast chain;  
apparatus comprising receiving means for receiving a signal from the transmitter apparatus, means for displaying information in response to a signal received by the receiving means, means responsive to a user input to provide an outgoing signal and transmitting means for transmitting the outgoing signal; and  
receiving apparatus for receiving the outgoing signal.
27. A communications system as claimed in claim 26, wherein the receiving apparatus further comprises means for storing the received outgoing signal for subsequent processing.
28. Apparatus as claimed in claim 27, wherein the receiving apparatus comprises a station in a cell of a multi-cell communication system.
29. An apparatus as claimed in claim 28, wherein the multi-cell communication system comprises a paging system.

30. An apparatus as claimed in any one of the claims 27 to 29, wherein the means for displaying information is arranged to display information immediately in response to a signal received by the receiving means.

31. A method of communication comprising:

storing information concerning transmission from a primary broadcaster, transmitting the information and synchronising the transmission of information to at least one transmission from the primary broadcaster, wherein the information is transmitted distinct from the primary broadcast chain;

receiving a signal from the transmitter apparatus, displaying information in response to a signal received by the receiving means, providing an outgoing signal in response to a user input and transmitting the outgoing signal; and receiving the outgoing signal.

32. A method as claimed in claim 31, wherein the transmission distinct from the primary broadcast chain is via a cellular paging system.

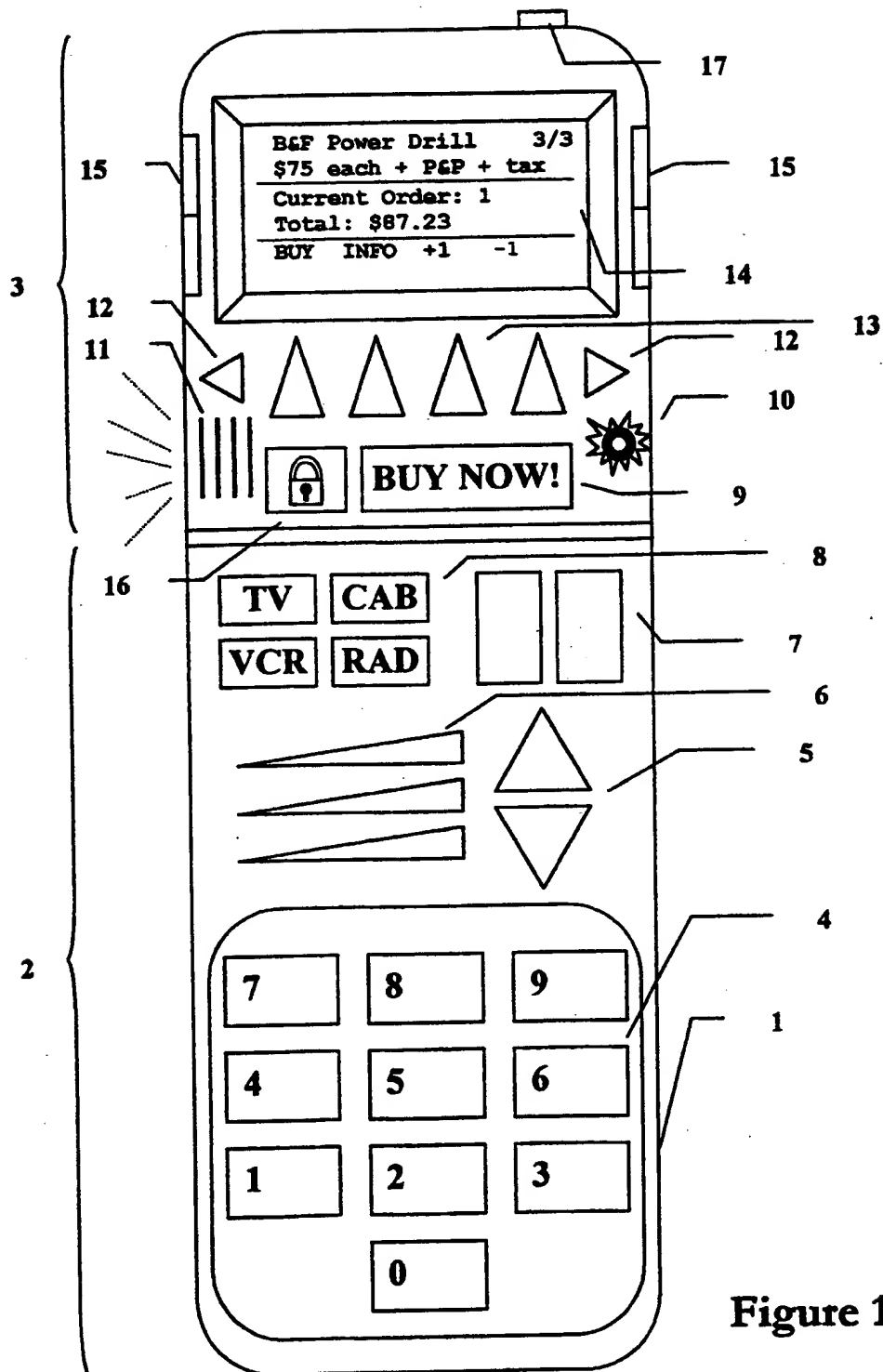


Figure 1

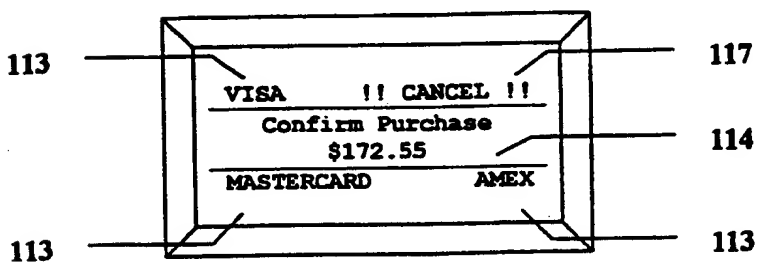
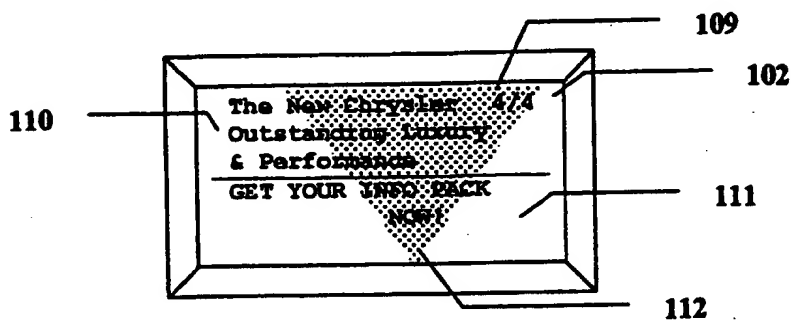
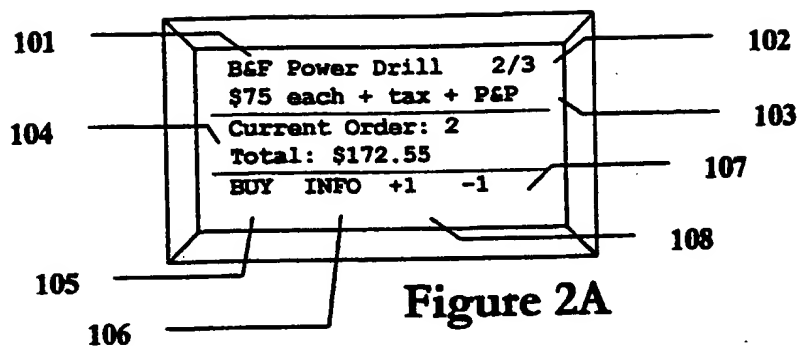


Figure 2C

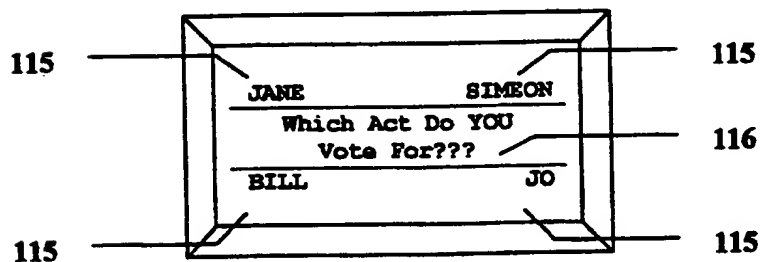


Figure 2D

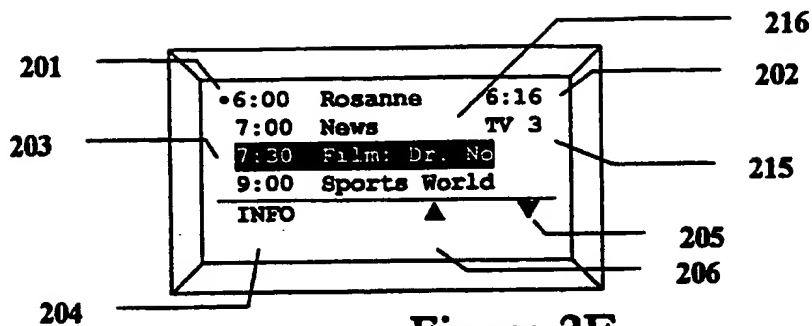


Figure 2E

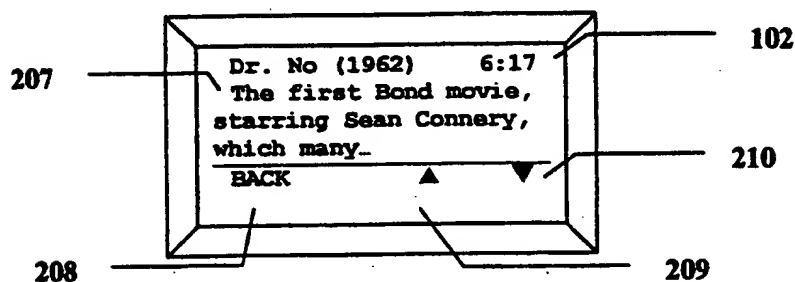


Figure 2F

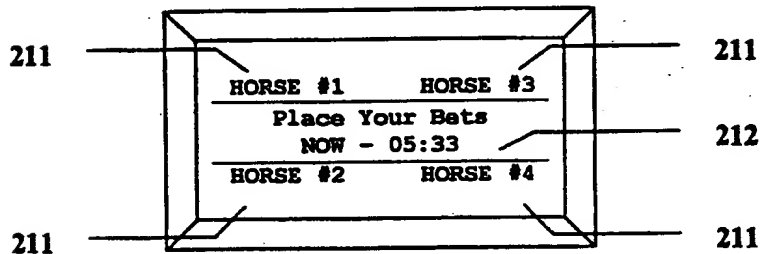


Figure 2G

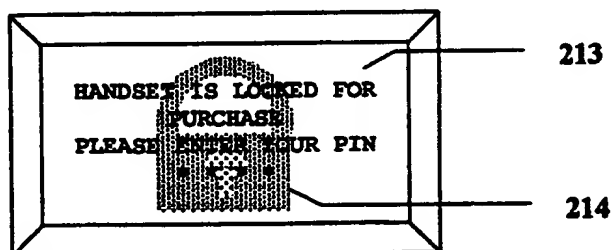


Figure 2H



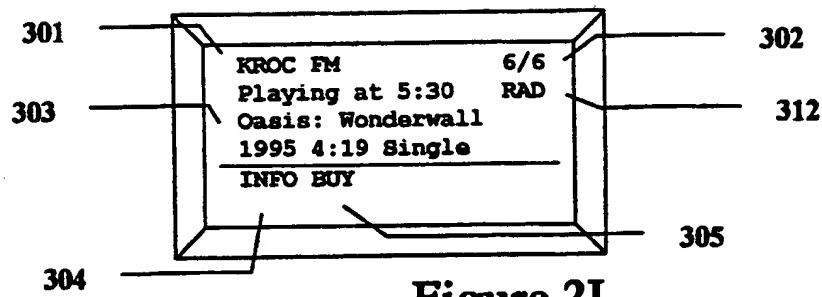


Figure 2I

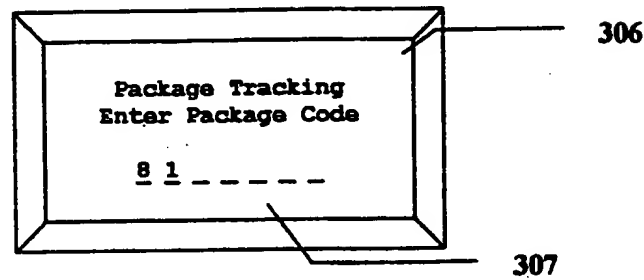


Figure 2J

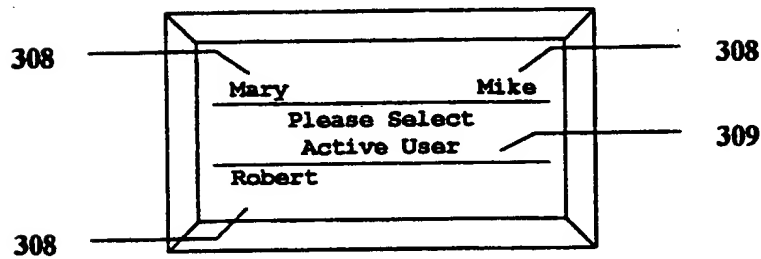


Figure 2K

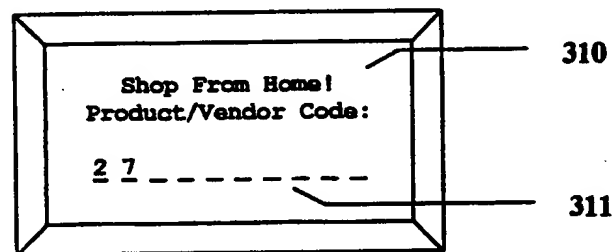


Figure 2L

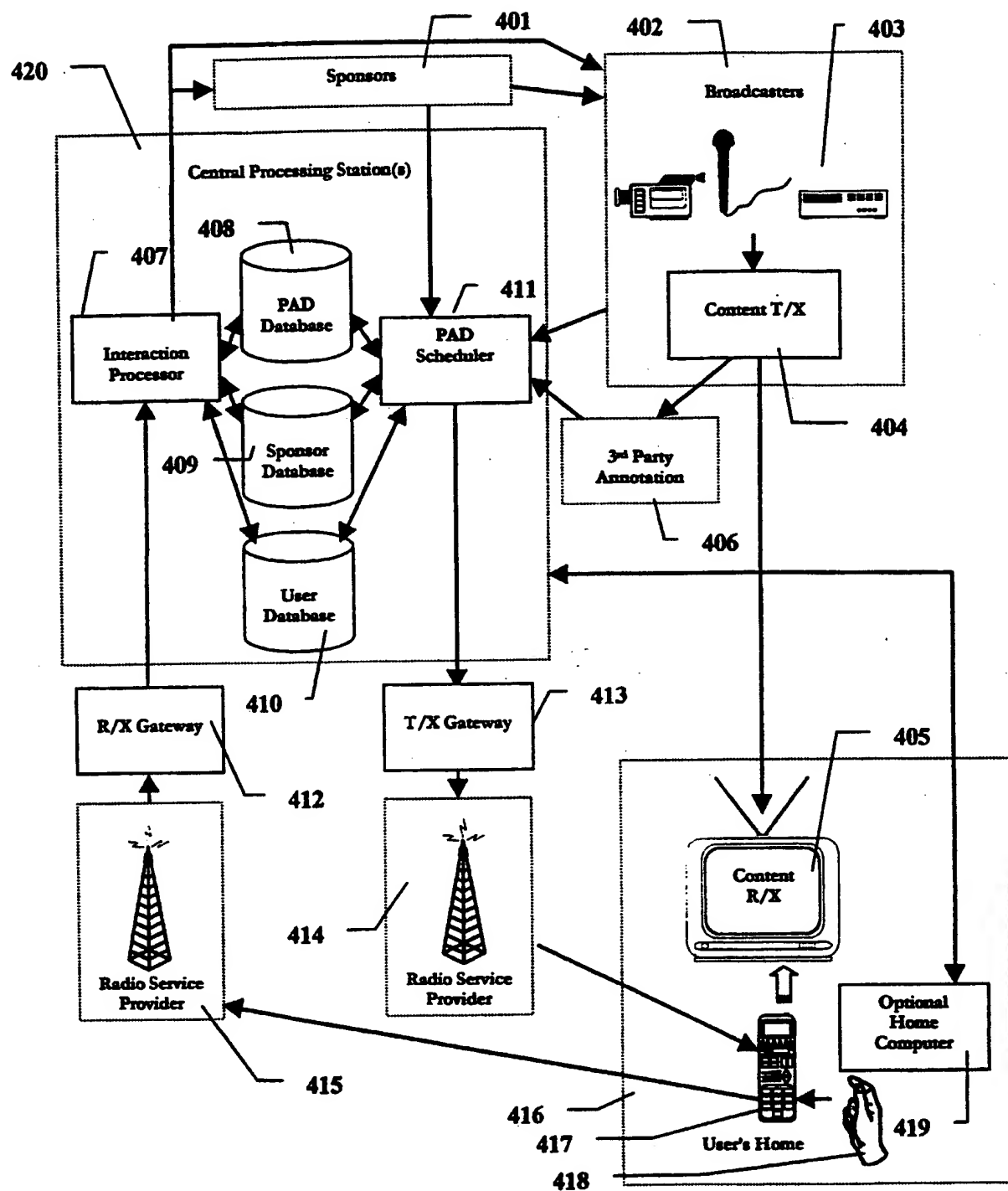


Figure 3

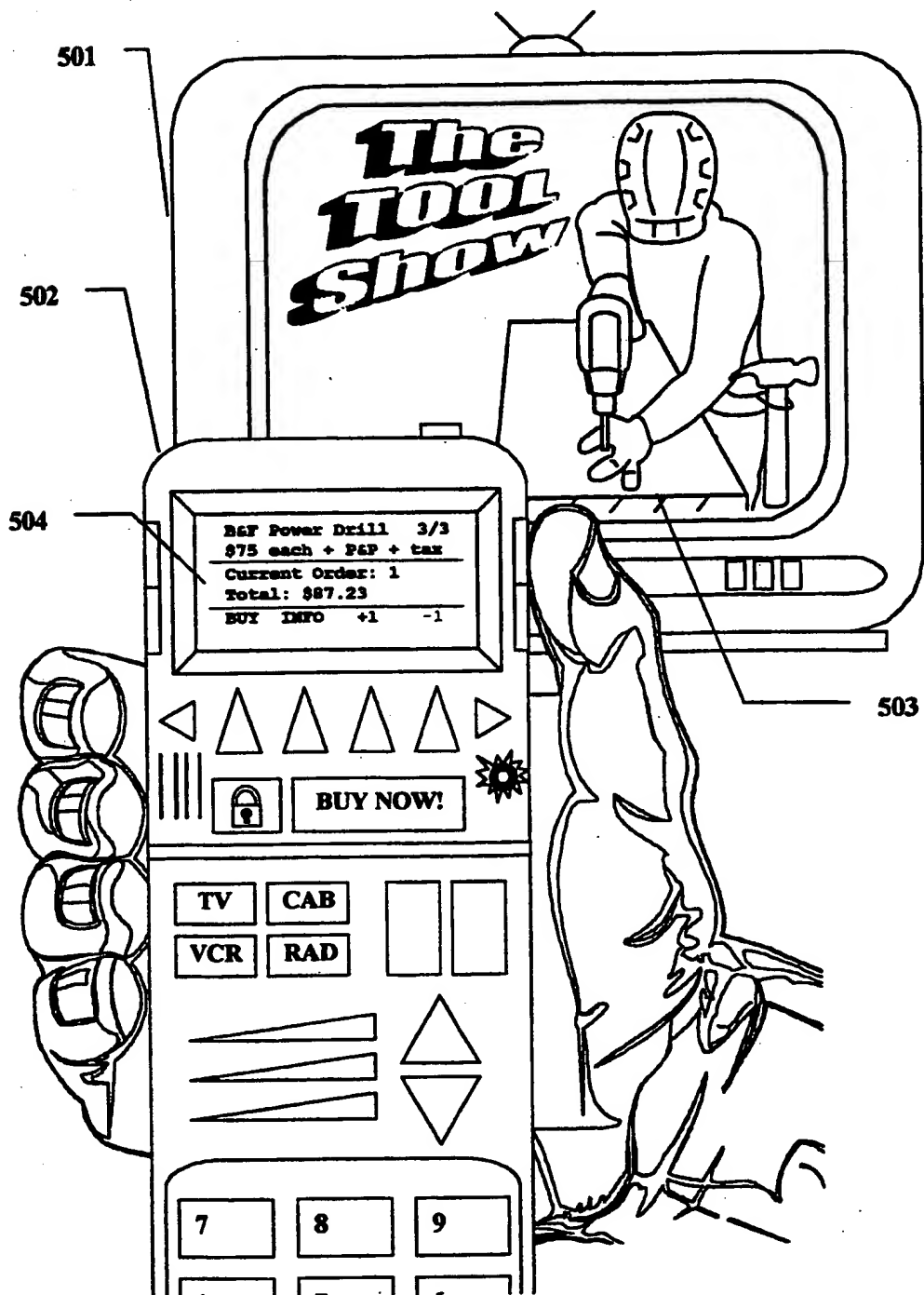


Figure 4

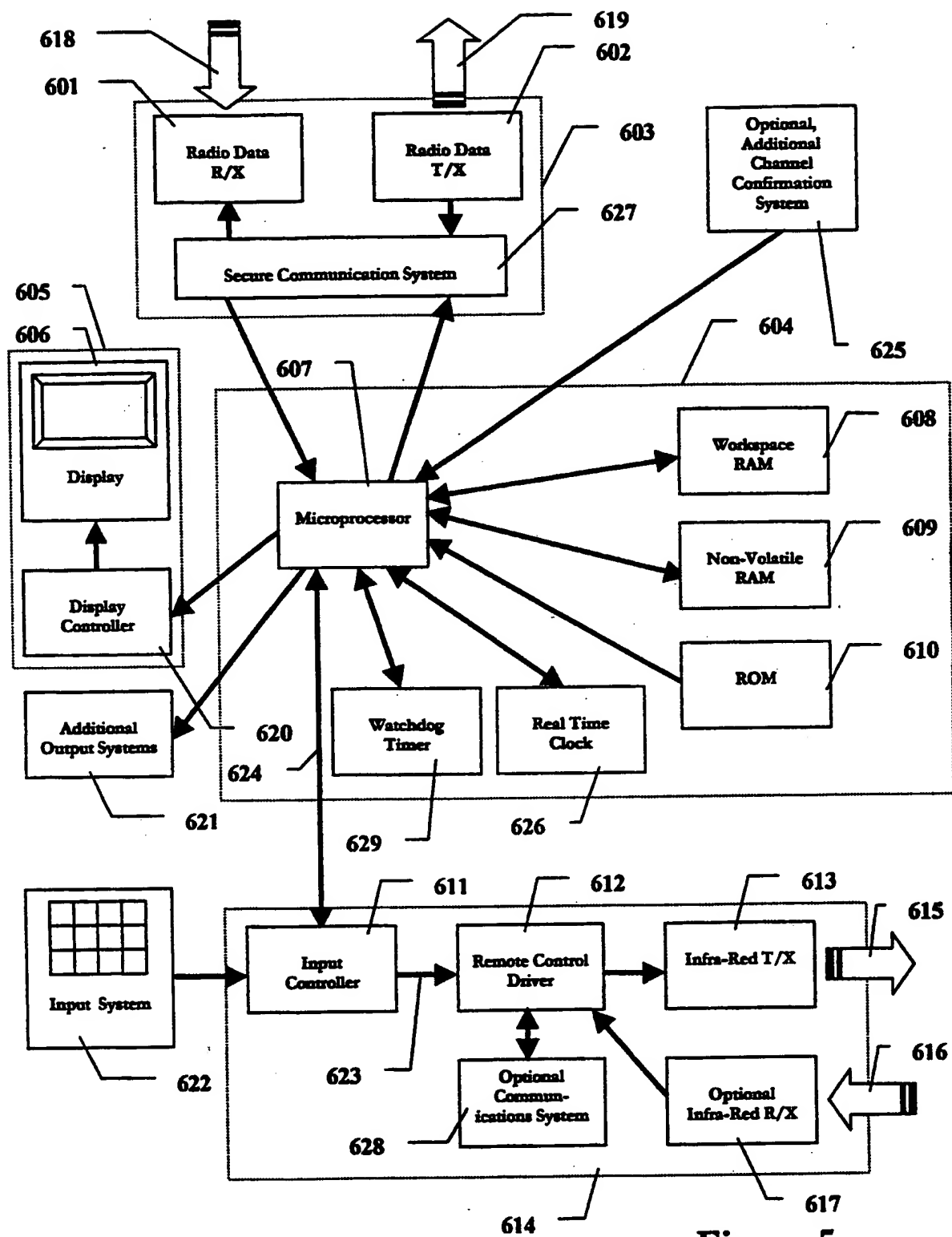


Figure 5

8/9

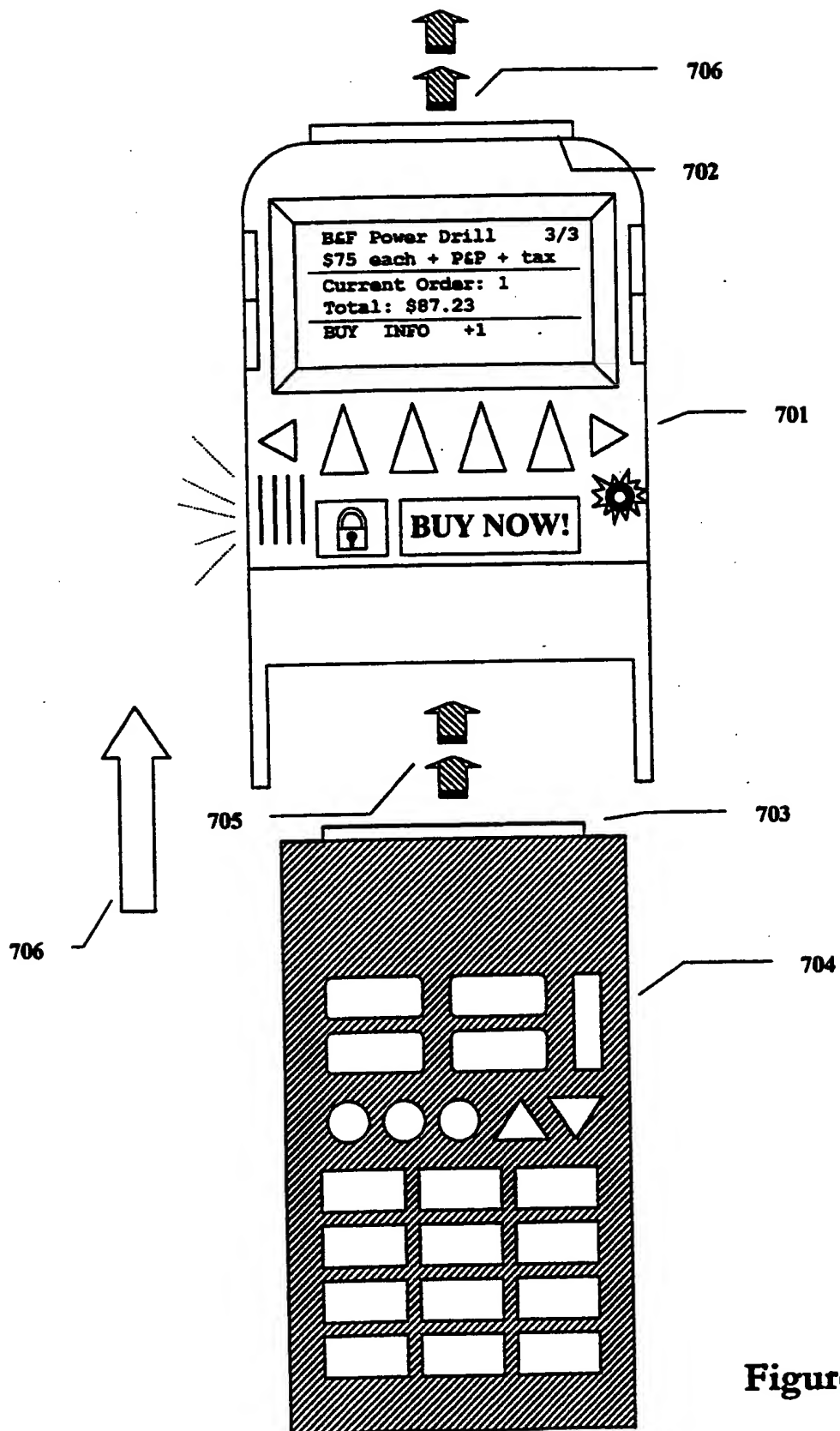


Figure 6

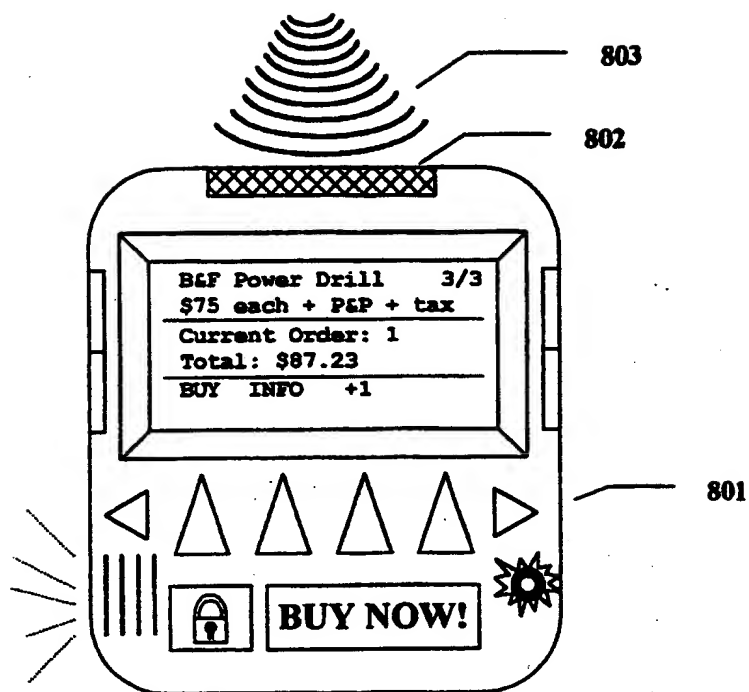


Figure 7A

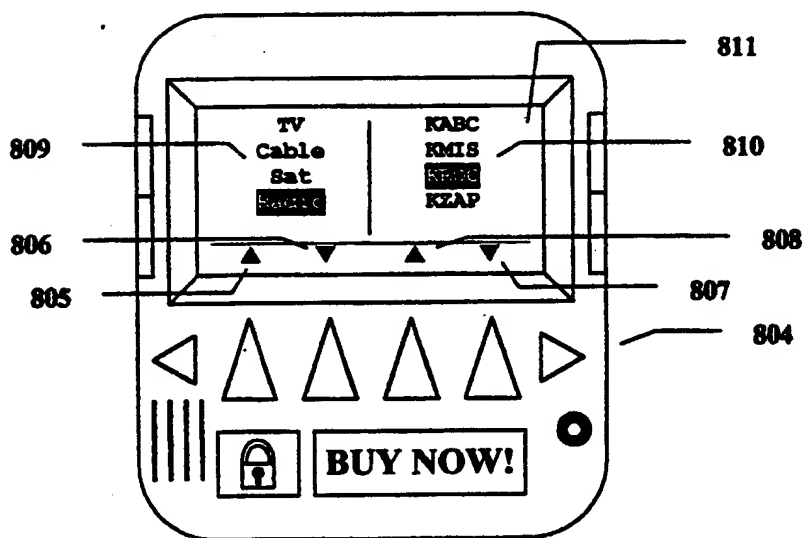


Figure 7B

# INTERNATIONAL SEARCH REPORT

Intern Application No

PCT/GB 98/02152

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 H04N7/173

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H04N H04H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 5 638 113 A (LAPPINGTON JOHN P ET AL) 10 June 1997 see column 8, line 9 - column 9, line 33; figure 1	1,6-8, 10,11,15 20,26,31
A	WO 96 28903 A (BELL ATLANTIC NETWORK SERVICES) 19 September 1996 see page 15, line 3 - page 18, line 20; figure 4	1
A	GB 2 304 217 A (GEN INFORMATION SYSTEMS LTD) 12 March 1997 see page 4, line 6 - page 6, line 12 see page 7, line 13 - line 23	1
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Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

### \* Special categories of cited documents:

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"A" document member of the same patent family

Date of the actual completion of the international search

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20/10/1998

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European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax (+31-70) 340-3016

Authorized officer

Beaudoin, O

# INTERNATIONAL SEARCH REPORT

Intern al Application No

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 5 410 326 A (GOLDSTEIN STEVEN W)</p> <p>25 April 1995</p> <p>cited in the application</p> <p>see the whole document</p>	1



# INTERNATIONAL SEARCH REPORT

Information on patent family members

Internat'l Application No

PCT/GB 98/02152

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Information on patent family members

Internat'l Application No

PCT/GB 98/02152

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5410326    A	25-04-1995	NONE	

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
1 March 2001 (01.03.2001)

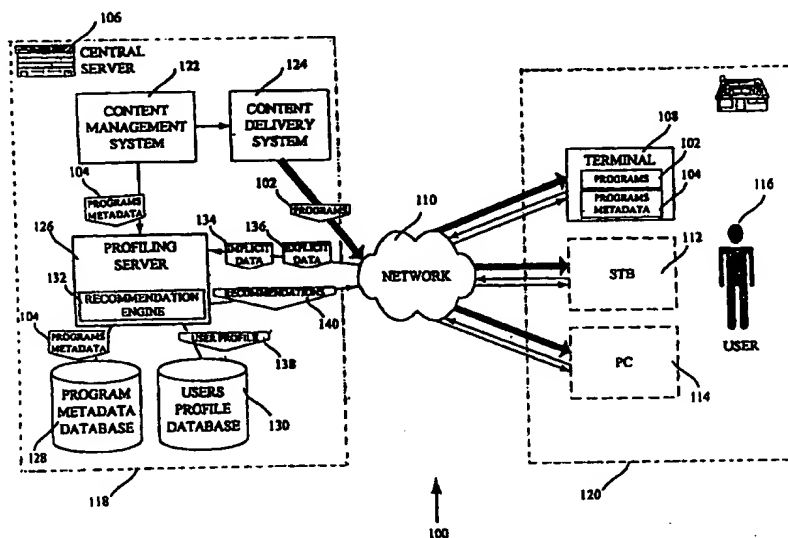
PCT

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(71) Applicant (for all designated States except US): SINGULARIS S.A. [CH/CH]; 8, côtes de Montbenon, CH-1003 Lausanne (CH).  
(72) Inventor; and  
(75) Inventor/Applicant (for US only): VAMPARYS, Franck [CH/CH]; Chemin du Croset 8, CH-1024 Ecublens (CH).  
(74) Agent: MOETTELI, John; Bugnion S.A., Case Postale 375, CH-1211 Genève 12 (CH).  
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(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR CREATING RECOMMENDATIONS FROM USERS PROFILE BUILT INTER-ACTIVELY



(57) Abstract: A system is provided for generating program recommendations for a plurality of users based on program metadata and user profiles. The system uses a central proliferating server unit that includes a program agent system, a user agent system, and a recommendation engine. The program agent system has means for importing program metadata from a content management system and for storing the program metadata into a program metadata database. The user agent system includes (i) means for collecting explicit and/or implicit information on program metadata and users; (ii) means for storing the explicit and/or implicit information into a user profile database; and (iii) means for transmitting a list of program recommendations for users to user terminals. The recommendation engine includes (i) means for building program recommendations for users based on program metadata and user profiles, through use of a plurality of filtering engines for evaluating user profiles, with a schedule of available programs; (ii) means for gathering and weighting the built program recommendations in order to generate a list of program recommendations per user; and (iii) means for storing said list of program recommendations in a user profile database.



IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *With international search report.*

## **METHOD AND APPARATUS FOR CREATING RECOMMENDATIONS FROM USERS PROFILE BUILT INTERACTIVELY**

### **Background of the Invention**

This invention relates to entertainment media management systems, and, more particularly, to an apparatus and method that recommends a program to a user based on program metadata and on user profiles.

In order to better understand this disclosure, the following definitions  
5 are offered. A program is a media (most likely an electronic media such as music, television programs, digital video or a tangible item such as a book, compact disc or a live event such as a play, opera, etc.) with validity periods. Validity periods define time periods when the program can be delivered to users. Program metadata are data that describes a program.

10 Recently, breakthroughs in digital technologies allow users to receive hundreds of video channels. In fact, it is widely believed that the barrier of 1000 channels will soon be broken. In this new environment, the amount of content available is overwhelming. Electronic guides are limited by the amount of information that can be displayed on a single screen at a given  
15 time. Additional tools are therefore required in order to help the user find a program that he is interested in. One way to do this is to propose recommendations on programs addressing an individual user's preferences (for example user tastes, behavior, demographic information). The prior art includes various systems directed toward enhancing television-viewing efficiency by  
20 providing individual suggestions. For example, an early system described in US Pat. No. 4,170,782, the content of which is incorporated herein by

reference, allows the viewer to preselect a television-viewing schedule of desired television channels to be viewed during selected time periods. This system also monitors the television viewer and relays this information to a central data processing center over a communications link. Other similar  
5 systems, such as those described in US Pats no. 4,264,924 and 4,706,121, the contents of which are incorporated by reference, facilitate access to programming but provide no assistance to the user in determining what programming to select for subsequent viewing. US Pat. No. 4,745,549 and 5,075,771, the contents of which are incorporated herein by reference, try to  
10 provide selective access to programming from user preferences built on a user questionnaire. However, this kind of interaction based on a general questionnaire does not provide any insights as to the desirability of a particular program.

The system described in US Pat. No. 5,223,924, the content of which  
15 is incorporated by reference, begins to address the above problem by providing a user interface for automatically correlating the user preferences with TV program information and creating and displaying a personalized user program database based on the results of the correlation using a "free-text search" engine. In this system, the user profile is limited to automatically  
20 update the database of "preferred" programs using direct user feedback.

US Pat. No. 5,410,344, the content of which is herein incorporated by reference, provides a system for selecting programs for presentation to a viewer. The programs selected from a viewer preference file built with explicit ratings on program metadata and from a neural network engine. A  
25 neural network is an black box of processing elements with a limited number

of inputs and outputs. These processing elements are able to "learn" by receiving weighted inputs that, with time and repetition, can be made to produce appropriate outputs. The viewer preference file is accessible only locally on the viewer terminal and contains no implicit ratings so that the value and efficiency of recommendations are limited.

US Pat. No. 5,534,911, the content of which is incorporated by reference, describes a virtual personal channel but user profile is stored locally and is non persistent between sessions. In U.S. Pat. No. 5,801,747, the content of which is incorporated by reference, a user-profiling server is described. However, user profiles are built only based on viewing activities of the user. Further, the system can only display preferred channels or categories.

Some prior art systems address the problem of suggesting programs from a large program database such as a movie database (for video on demand) as described in U.S. Pat. No. 5,483,278, the content of which is incorporated by reference. In this system, the user makes explicit ratings on program metadata. The system presents programs in an individual order and the user can rate them explicitly (e.g., by selecting "liked" or "disliked") and the order of program presentation to the user is modified. The user profile is stored locally with respect to the terminal and is non persistent so that the interest of such a system is limited.

Referring to US Pat. No. 5,758,257 and US Pat. No 6,020,883(the content of which is incorporated by reference), two profiles are built from explicit ratings, one on content data and one on viewer's preferences. An "agreement matrix" is then calculated by comparing the two profiles and a

“virtual channel” is generated, providing personal recommendations on programs to each viewer. A feedback path with monitoring information is also provided so that user profiles and content profiles can be improved. This system works also with movies, music or book databases (kiosk). This  
5 system includes an “agreement matrix” and is well adapted to work inside a powerful terminal but not on a profiling server with millions of users and a limited resource terminal.

In US Pat. No. 5,798,785, the content of which is incorporated herein by reference, a terminal offers the ability to assist a viewer in choosing  
10 programs for viewing. Program recommendations are built from information on frequently viewed programs, persistent profile information and user mood information. This information is interpreted into preferred program indicators and matched with the program metadata to suggest a list of programs. The first limitation of this system is that it is not able to make suggestions by  
15 correlated profiles of different users. The second limitation is that the data gathering and analysis techniques used are adequate for a powerful terminal but not for a central profiling server with millions of users.

Therefore, what is needed is a system and method which overcomes the drawbacks of the prior art, generating user program recommendations  
20 from the knowledge of the user profile itself, and also from the profiles of its neighbors that have the same tastes.



### Summary of the Invention

A computer-readable medium is encoded with a method of profiling that collects explicit and implicit data on users related to programs that can be accessed by users and to provide program recommendations to each user.

5       The system and method is designed for the server-side and limited resource terminals to set up user profiles from explicit and implicit data simultaneously on a full program schedule database as well as a specific program (e.g., movie) database.

Schedules on program availability and program metadata are  
10   broadcast to or received on request by the user terminal through a communication medium from a central system that contains a network of physical servers (network, application, database server for example). When, from a terminal, a user interactively rates a program or a field of the program metadata, this explicit rating is sent to the profiling server through the return  
15   path and is stored in the user's profile database. The profiling server collects information on user tastes with respect to program metadata. The profiling server also receives implicit information from user behavior such as user program remind actions, user purchase actions, or user monitoring information. All these implicit ratings complete the profile of each user.  
20   Then the recommendation engine of the profiling server evaluates the profile of users with the schedule of programs that are now available and that will be available in the near future. Based on the evaluation process, the recommendation engine builds recommendations of programs for users. The recommendation engine works with several different filtering engines such  
25   as a content filtering engine and a collaborative filtering engine and treats

one user at a time in each filtering engine. Recommendations are weighted and gathered at the output of these filtering engines and a unique recommendation per program is generated by the recommendation engine for each user. Then the list of program recommendations is stored in the profile of the user. These recommendations are sent to each user terminal on terminal request or by a push from the profiling server. The user can access the resulting recommendations through a user interface that displays recommendations of the best programs for him with different scenarios such as portal, menus, tickers, virtual channels, and lists.

10       An object of the invention is to provide a system and method for server-side and limited resource terminals to set up user profiles from explicit and implicit data simultaneously on a full program schedule database as well as a specific program database. Another object of the invention is to generate user program recommendations from the knowledge of the user profile itself, and also from the profiles of its neighbors that have the same tastes.

### **Brief Description of the Drawings**

The features and advantages of the present invention will become more apparent and understood from the following detailed description which should be read in conjunction with the accompanying drawings, in which:

FIG. 1 is a block diagram of a profiling and recommendation system;

FIG. 2 is a schematic diagram of a terminal screen of the invention;

FIG. 3 is a flow chart of the method of collecting the explicit ratings of the user on program metadata;

FIG. 4 is a flow chart of the method of collecting implicit data on the programs the user has watched by storing the switches between channels;

5        FIG. 5 is a flow chart of the method of collecting implicit data on the programs the user has watched by evaluating the user's viewing time;

FIG. 6 is a block diagram of a system of the invention including a two-way profile server that receives, stores program metadata and user explicit/implicit data and then builds and returns program recommendations;

10       FIG. 7 is a block diagram of a recommendation engine that provides program recommendations from a set of filtering engines;

FIG. 8 is a flow diagram of a method for selecting programs from the user profile and from program metadata in the content filtering engine;

15       FIG. 9 is a block diagram of a user terminal including network connections and user interactions;

FIG. 10 is a representative program description guide with explicit ratings displayed on top of a TV program.

### **Detailed Description of the Preferred Embodiment**

20       The following embodiments of the present invention will now be described in detail relative to Figures 1 to 10.

Referring now to Fig. 1, the present invention 100 is shown as part of an expanded program delivery system 100 that delivers programs 102 and program metadata 104 from a central server 106 to a user terminal 108 through a network 110. In the case of a cable television system, the central server 106 can be located  
25       at the operator head-end and the user terminal 108 can be an operator set-top box

(STB) or the television itself. In the case of an Internet solution, the central server 106 can be integrated into the web and application servers and the terminal 108 can be a personal computer (PC) 114. The terminal 108 is a device that displays programs 102 and program metadata 104 to a user and that can interact with the user. In the television field, the terminal 108 is usually a set-top box (STB) or the television set. The terminal 108 can also be a wireless device (PDAs, mobile phones, etc.).

### **Major System Components**

Referring again to Fig. 1, the system 100 operates within the context of a content or service provider system for communicating programs 102 and programs metadata 104 to users 116. This system 100 is composed of two parts 118 and 120. The first part 118 is the central server 106 that manages and delivers content to the users 116. The second part 120 is the user terminal 108 that receives the content and allows the user 116 to interact with the central server 106. A content management system 122 manages programs 102 and programs metadata 104 and is synchronized with the content delivery system 124 that sends programs 102 to the network 110, destined to the users 116. The content management system 122 also sends program metadata 104 to the profiling server 126. The profiling server 126 collects information on programs metadata 104 and on user profiles and stores these data in the program metadata database 128 and in the users profile database 130. The profiling server 126 is the main component of the invention: from the collected data, the server 126 builds and delivers program recommendations to each user 116. The recommendations are received by the terminal 108. A user 116 can use different terminals 108 to access its profile on the profiling server 126. The profiling server 126 imposes no constraints

on the infrastructure of the network 110 if we assume a reasonable bandwidth adequate for the number of users 116.

It should be noted that program metadata 104 may also be obtained from other sources, such as a ftp xml file or in the media itself, digitally  
5 embedded in the content and need not come from the content management system 122.

### **Program Metadata and User Profiles**

A program 102 is described by its metadata 104. Metadata 104 of programs contain a large set of possible fields but only a few subsets of this  
10 fields are useful for the profiling server 126 and its recommendation engine 132. A more detailed description of a preferred embodiment is provided as follows.

(a) Program ID 218: The Program ID 218 uniquely identifies a particular program 102. The ID 218 can be an integer (32 bits) or a long  
15 integer (64 bits) or a string of bytes not exceeding 2000 bytes.

(b) Title 208: The title 208 uniquely identifies the main title of the program 102 and is defined as a string.

(c) Category 210: The category 210 identifies the media content and media type category of a program 102. The media type category defines the  
20 type of program 102 such as a movie, song, a documentary, a live event, a software, etc. The media type category is defined in one level, which means it is one element of a list of category values. The media content category indicates the nature of the content of the program 102. It consists of three

hierarchical level categories. For example, a program 102 might have the media content level categories of (1) sport, (2) football, and (3) Arsenal. In the case of an Electronic Program Guide (EPG), the two higher-level fields can be compatible with category fields defined in the Digital Video  
5 Broadcasting Standard (DVB). Category fields are defined as strings. Optionally, a unique ID can be added to the string definition.

(d) Description 220: The description 220 describes the program 102 in a textual form and is defined as a string. This field is optional for the recommendation engine but useful for the users 116.

10 (e) People 212: People 212 identify the stars or other persons of interest in the program 102. One individual is defined by a people category and by name. Examples of people category are: actor, producer, presenter, famous, etc. People categories and people names are designed as strings. Optionally, a unique ID can be added to the string definition.

15 (f) Keywords 214: Keywords 214 describe the program 102 by a list of keywords. Each keyword represents the content of one part of the program 102. These keywords can be interpreted without the category fields. For example, a keyword might be the "Louvre" in the context of the category "documentary, travel, France". Optionally, a unique ID can be added to the  
20 string definition of the keyword.

(g) Parental rating 216: Parental rating 216 identifies restrictions regarding who can access the associated program 102. For example, the rating might be "users older than 13". Classification can be by age or based upon content such as violence, language, nudity and/or sex. Parental control

attributes are defined as strings. Optionally, a unique ID can be added to the string definition.

User profiles are built on explicit and implicit data 134, 136 collected by the profiling server 126. Explicit data 136 is data that are produced by a direct interaction with the user 116. Each user 116 can indicate using a rating scale his preferences on or his reaction to a specific program 102 or a program category or people or keywords. All the user ratings using the rating scale are collected by the profiling server 126 and are stored in the users profile database 130. When a user 116 purchases a program 102 or makes a remind action on a program, these actions are also stored in the user's profile database 130. Implicit data 134 is data that is monitored by the terminal 108 and sent to the profiling server 126. This data 134 is also stored in the user's profile database 130. Implicit data 134 gives information on the viewing habits of the user 116, such as which programs 102 he has watched or used, and the time of day the program was viewed.

The user profile database 130 is structured as follows:

(a) Basic data: When users buy or log on to the terminal 108, he must identify himself. The profiling server 126 collects this information. Examples of this information are: nickname, age, zip code, gender, income, etc.

(b) History data: This data contains all the explicit and implicit data 134 and 136 collected.

(c) Processed data: This data contains information that is generated by the profiling server 126. For example, this includes program recommendations data generated for each user.

(d) Aggregated data: This data contains data that are extracted and aggregated based on a user profile 138. In this aggregated data, reference to an individual user 116 is lost.

Referring now to FIGs. 2 and 3, a submethod 300 is described that  
5 acquires explicit data 136 by collecting the user's tastes by means of a rating process. In a first step 302, the terminal 108 (shown in FIG 2) receives program metadata 104 and stores the data locally. In a second step 304, the metadata is displayed when necessary or requested. In a third step 306, following the display of the metadata 104, the user can select a field 214 of a  
10 displayed program 200, assign a grade 206 for that field 214 and validate this rating using a validate button such as that on a remote control or touch screen. In a fourth step 308, the rating 206 is saved locally on the terminal 108. In a fifth step 310, the rating is sent to the profiling server 126 asynchronously. A delay can be added before the transmission of the  
15 profiling server 126 in order to facilitate the management of the load of the server. When the delay is set to zero, optionally, the profiling server 126 can activate the recommendation engine 132 and immediately returns program recommendations 204 generated from the new rating. Fields 222 that can be rated are the metadata 104 available for each program 200 such as title,  
20 categories, people, keywords, etc. The same rating process also applies to purchases and reminder requests acquisition.

Referring now to FIG. 4, a submethod 400 is described for acquisition of implicit data 134 on a terminal 108. In a first step 402, a time counter is initialized and the system is waiting a user action. In a second step  
25 404, the user changes a channel. In a third step 406, an evaluation of the



manner in which channels are changed (the "channel zapping") is performed. This evaluation determines the time spent on the previous channel. In a fourth step 408, the duration between zapping is evaluated. In a fifth step 410, if the duration between zapping is greater than the limit, zapping information is accepted and is saved locally 120. In a sixth step 412, the method collects a predefined (configurable) number of channel changes/zappings on the terminal 108. In a seventh step 414, the method sends this information to the profiling server 126 asynchronously. To use implicit data 134, the recommendation engine 132 does not only need to know zapping information but also how long a user has watched a program 200. This information can be built from the zapping information and from the program schedule on the server side 106. However, this additional information can also be built up in the terminal 108.

Referring now to FIG. 5, this last option has the advantage of reducing the load of the server 106. The initial steps 502, 504, 506 of this submethod 500 are the same as that of FIG. 4 and this submethod works in parallel with the main method shown in FIG. 4. After the channel zapping evaluation 506, an evaluation step 508 is added which evaluates the programs 200 watched. This evaluation step 508 determines how long the current program 200 of the previous channel has been watched by the user. In a time check step 510, if the program 200 is terminated, the time the program was watched is evaluated to determine whether it exceeds the predetermined limit (which is configurable). If so, in a saving step 512, the program-watched information is stored locally on the terminal 108. In a collection step 514, the method returns to the first step 502 until the number of program 200 watched reaches a maximum. In a subsequent step 516, after having collected a predefined

(configurable) number of watched program information on the terminal 108, the information is sent to the profiling server 126 asynchronously.

### **Profiling System**

Referring now to FIG. 6, a block diagram of the preferred embodiment of the profiling server 126 is described. The profiling server 126 includes a core platform system 602 that synchronizes all the subsystems (132,604,606) of the profiling server 126. First, a program agent system 604 receives program metadata 104 from the content management system 122, parses the program metadata 104, converts the program metadata into an internal format as described earlier, and stores the new program metadata in the program metadata database 128. Only the program agent system 604 has to be adapted when a different content management system 122 is connected to the profiling server 126. In a matter similar to the program agent system 604, a user agent system 606 is the gateway between the user terminal 120 and the users profile database 130. The user agent system 606 receives explicit and implicit data 136 and 134 respectively from the user terminal 120. It identifies, validates and then stores the data in the user profile database 130. If the terminal 120 requests immediate program recommendations built on the newly received data, the user agent system 606 sends the request to the core platform system 602 that activates the recommendation engine 132. The recommendation engine 132 returns the program recommendation list to the core platform system 602 that sends the recommendations to the terminal 120 through the user agent system 606. The core platform system 606 controls and manages program and user agent sys-

tems 604 and 606, respectively, as well as the recommendation engine 132. The profiling system 126 has been designed as a flexible architecture.

### **Recommendations Engine**

5 Referring now to FIG. 7, a block diagram of the recommendation engine 132 is shown. The engine 132 has two working modes. In a first working mode, called a low priority batch mode, the recommendation engine 132 builds new program recommendations for each user when the core platform system 602 informs it that the new program metadata 104 has been  
10 added to the program metadata database 128. Depending on the size of the user's profile database 130, the update of each user can take a long time. A second mode with a high priority allows the profiling system 600 to respond faster to a request of a user. In this mode, the profiling server 126 brings instant gratification of the user by giving him program recommendations  
15 related to the new rating he has sent to the profiling server 126. By evaluating one user at a time, the recommendation engine 132 can easily be adapted to multi-processors and multi-servers architecture with hash coding techniques on users.

In a first substep 702, the recommendation engine 132 selects the user  
20 it wishes to treat. In a second substep 704, once the user is selected, the recommendation engine 132 reads the user profile stored in the users profile database 130. Then the recommendation engine 132 activates different filtering engines 706, 708 and 710 with that profile. The recommendation engine 132 supports multiple algorithms and can aggregate the result of the

different filtering engines 706, 708 and 710 to a single list of program recommendations. In a third substep 720, the user profile in the user profile database 130 is updated. In order to accomplish this, the weighting coefficients 712, 714 and 716 are added to each respective program recommendation of each filtering engine 706, 708 and 710. Coefficients 712, 714 and 716 differ depending on the filtering engine 706, 708 or 710 to which they apply and also depending on the program content category because a filtering engine can be better adapted to one content category than another content category. For example, the collaborative filtering engine 708 gives better results with the movie content category than with the sport content category.

The coefficients 712, 714 and 716 can be tuned manually. They can also evolve dynamically by using a feedback adaptive algorithm well adapted to heuristic algorithms. The recommendation engine 132 adapts the coefficients 712, 714, and 716 by using for all users either an evaluation of the difference between the recommendation grade and the grade the user has given to that program or an evaluation of the difference between the recommendation grade and the duration the program 200 has been watched by the user. By default, the recommendation engine 132 uses two complementary filtering algorithms: content filtering and collaborative filtering. The content filtering engine 706 generates recommendations separately for each user while the collaborative filtering engine 708 finds correlation between the user tastes. The collaborative filtering requires bootstrap to start to generate recommendations while the content filtering does not. The content of the filtering engine 706 can generate program recommendations as soon as at least one rating has been made by the user

116. Of course, if only a few ratings are given, the customization of the programming recommendations is low.

One solution consists of providing a default profile when the user profile is first created. This default profile can be built on the basic data mentioned under the heading "Program Metadata and User Profiles",  
5 available on the user 116 and on aggregated data such as the best or the most rated programs by other users. Another more interesting solution is to leave the choice to the user 116 to choose, as a default profile, the profile of a famous person he likes. Collaborative filtering has proven useful for movie,  
10 book, music or documentaries. Content filtering has powerful availability with news, sport, people, and all strongly categorized items. In the TV context it also fits for periodic programs 102. The collaborative filtering engine 708 requires more intensive CPU resources than the optimized content filtering engine 706, the collaborative filtering engine 708 can only be used  
15 for a subset of all the programs 102 (e.g. movies, documentaries, music). These two algorithms respectively have proved to be well adapted to item recommendation and are complementary. Nevertheless, the recommendation engine 132 can easily integrate another filtering engine such as a more general social filtering engine 710. Each filtering engine 706, 708, 710 has  
20 access to the program metadata database 128 with the explicit and implicit data 136 and 134.

FIG. 8 describes the internal architecture of the content filtering engine 706, custom developed according to the needs of the present invention. The engine 706 is optimized for structured and categorized  
25 metadata. When the content filtering engine 706 is started, program metadata

104 with a right validity period are selected in a selection step 810 and indexed in an indexing step 812 for each program field such as "title", "people", "content category", and "keyword" used by the engine. From the user profile already loaded 704, the engine 706 separates information on user tastes 802, user purchases 804, user reminder requests 806 and use monitoring information 808. There is no technical limitation to the number of subjects for possible characterization or categorization -other user information can be used by the engine 706. Each information category 702, 704, 706 and 708 goes through a tuned matching engine for tastes 814 for purchases 816 for reminder requests 818 and for monitoring 820. Each matching engine 814, 816, 818 and 820 uses the same algorithm based on static matching rules and non-linear distance estimation between program metadata 104 and user profile fields (defined in user profiles section) but with different rules and distance estimation coefficients for each matching engine. Rules and distance estimation coefficients are based on heuristics built on the knowledge acquired through development, study, and experimentation. Use of matching rules allows the purveyor to find a balance between search (Indexes) and knowledge (Rules), the two main approaches of AI. Details on rule-based algorithm can be found in Charles Forgy, "The Rete Algorithm: A Fast Algorithm for the Many Pattern / Many Object Pattern Matching Problem", 1979, PhD thesis, Carnegie-Mellon University, the content of which is incorporated herein by reference. Due to the indexing techniques (read access in  $O(1)$ ) used on program metadata 104, the content filtering engine 706 is very fast and can support a large number of users 116. The bottleneck is on database access and not on the engine 706. Structured program metadata 104 is key to guaranteeing the satisfaction of program

recommendations 204 and to guaranteeing a fast content filtering engine 706. Programs suggested by the matching engines 814, 816, 818 and 820 are then weighted using a weight coefficient 822, 824, 826 and 828 respectively and aggregated in a list of program recommendations. A first level 830  
5 aggregates program recommendations built from the user behavior (purchase, remind, monitoring) and a second level 832 aggregates these recommendations with the recommendations built in the taste matching engine 814. The matching engines (814, 816, 818 and 820) take into account at what time the program 200 has been watched, reminded and/or purchased.  
10 For example, some users 116 watch movies in the evening and news in the morning while others watch news in the evening. The recommendation engine 132 tries to follow this time pattern when it generates the program recommendations. The content filtering engine 706 generates as output a program recommendation list 906 with a grading 920 on the programs of the list  
15 918.

### **User Terminal**

Now referring to FIG. 9, the data flow of the terminal 120 is shown. The terminal 120 is a device that displays programs 102 and program metadata 104 to a user 116, collects and sends explicit and implicit data 136  
20 and 134, respectively, on users to the profiling server 126. A user 116 interacts with the profiling server 126 through the terminal 120 that displays its personal recommendations 204.

Now referring to FIG. 10, a real case of the process of interaction with the user 116 is shown. The terminal 120 displays a program description panel

902 with information on one program on top of another. Metadata 104 is displayed, including the program title 908, the content category 910 and a list of people 912. The rating panel 904 applied on the selected item 914 ("Peter Barton" in this example) and the user 116 can change the grade of the explicit rating 916. Program recommendations available for the current user 116 are displayed in the recommendation panel 906. Each program recommendation is represented by its title 918 and its grade 920, in this case, one to five stars. Different processes of interaction can also be used. For example, the program recommendations 906 can be displayed in a portal, on menus or be received by e-mail.

Multiple variations and modifications are possible in the embodiments of the invention described here. Although certain illustrative embodiments of the invention have been shown and described here, a wide range of modifications, changes, and substitutions is contemplated in the foregoing disclosure. In some instances, some features of the present invention may be employed without a corresponding use of the other features. Accordingly, it is appropriate that the foregoing description be construed broadly and understood as being given by way of illustration and example only, the spirit and scope of the invention being limited only by the appended claims.



**What is claimed is:**

- 1    1. A system for generating program recommendations for a plurality of users  
2    based on program metadata and user profiles, the system comprising a  
3    central profiling server unit, the unit comprising:
  - 4        (a) means for importing program metadata from a program metadata  
5        source;
  - 6        (b) means for storing the program metadata into a program metadata  
7        database;
  - 8        (c) means for collecting explicit and/or implicit information on program  
9        metadata from user interaction therewith;
  - 10       (d) means for storing the explicit and/or implicit information into a user  
11       profile database;
  - 12       (e) means for building program recommendations for users based on  
13       program metadata and user profiles, through use of a plurality of filtering  
14       engines for evaluating user profiles with a schedule of available  
15       programs;
  - 16       (f) means for gathering and weighting the program recommendations in  
17       order to generate a list of program recommendations per user; and
  - 18       (g) means for transmitting a list of program recommendations for users to  
19       user terminals for display.
- 1    2. The system of claim 1, further comprising means for storing said list of  
2    program recommendations in a user profile database.

1 3. The system of claim 1, wherein the means for importing program metadata  
2 from a content management system and the means for storing the program  
3 metadata into a program metadata database are comprised in a program agent  
4 system.

1 4. The system of claim 1, wherein the means for collecting explicit and/or  
2 implicit information on program metadata and users, the means for storing  
3 the explicit and/or implicit information into a user profile database, and the  
4 means for transmitting a list of program recommendations for users to user  
5 terminals are comprised in a user agent system.

1 5. The system of claim 1, wherein the means for building program  
2 recommendations, the means for gathering and weighting the built program  
3 recommendations, and the means for storing said list of program  
4 recommendations in a user profile database are comprised in a  
5 recommendation engine.

1 6. The system of claim 1, wherein the program metadata source is a content  
2 management system.

1 7. The system of claim 1, further comprising a terminal device having:

2 (a) means for receiving program metadata and user program  
3 recommendations;

4 (b) means for displaying the program metadata and user program  
5 recommendations; and

6 (c) means for collecting and sending explicit and/or implicit information  
7 on program metadata and users to the central profiling server.

- 1   **8.** The system of claim 7, further comprising means for storing the program  
2   metadata and user program recommendations for later access.
- 1   **9.** A computerized method encoded on a computerized medium, the method  
2   providing program recommendations to a user based on program metadata  
3   and user profile and comprising the steps of :
- 4       (a) accessing a server-side program metadata database;  
5       (b) presenting the program metadata on a user terminal for user selection  
6           and rating;  
7       (c) collecting explicit and/or implicit information on program metadata  
8           and the user;  
9       (d) creating at least one user profile based on collected user explicit  
10           and/or implicit information;  
11       (e) comparing the program metadata with the user profile for building  
12   program recommendations using (i) a recommendation engine supporting a  
13   plurality of filtering engines at the same time, generating a program  
14   recommendation list associated with each filtering engine and the user; (ii) a  
15   gathering and weighting engine, applied to the filtering engines output, for  
16   generating a list of program recommendations per user;  
17       (f) transmitting the list of program recommendations to the user terminal;  
18   and  
19       (g) presenting the list of program recommendations to the user.
- 1   **10.** The method of claim 9, further comprising the step of storing on the  
2   server side the list of program recommendations.

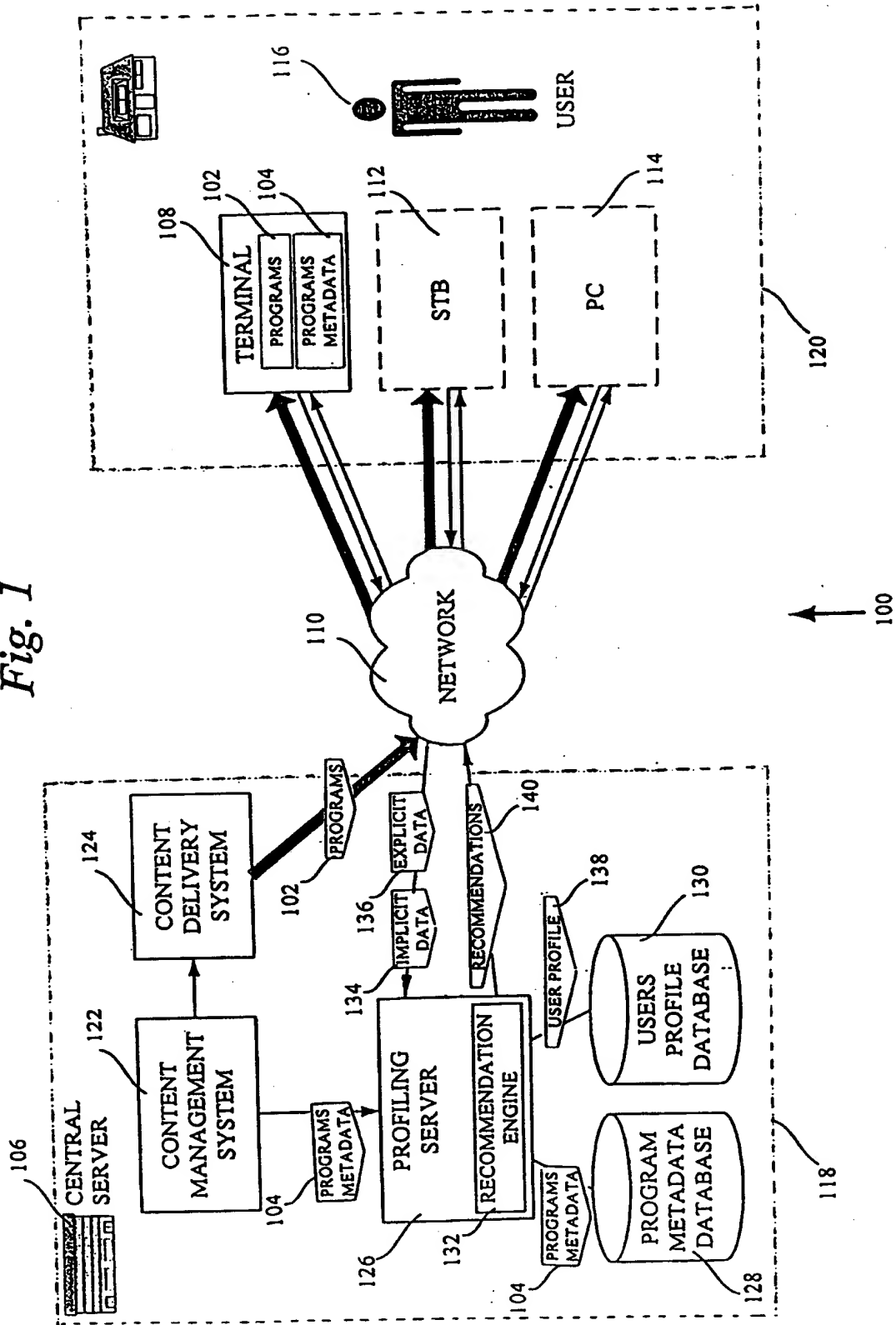
1    **11. The method of claim 9, further comprising the step of :**

- 2           **(a) receiving on terminal-side program metadata and user program**  
3           **recommendations;**  
4           **(b) displaying on terminal-side the program metadata and user program**  
5           **recommendations; and**  
6           **(c) collecting and sending from terminal explicit and/or implicit**  
7           **information on program metadata and users to the central profiling**  
8           **server.**

1    **12. The method of claim 9, wherein filtering engines include a content**  
2    **filtering engine using indexing techniques on program metadata and**  
3    **matching engines based on static matching rules and non-linear distance**  
4    **estimation between program metadata and the user profile.**

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Fig. 1



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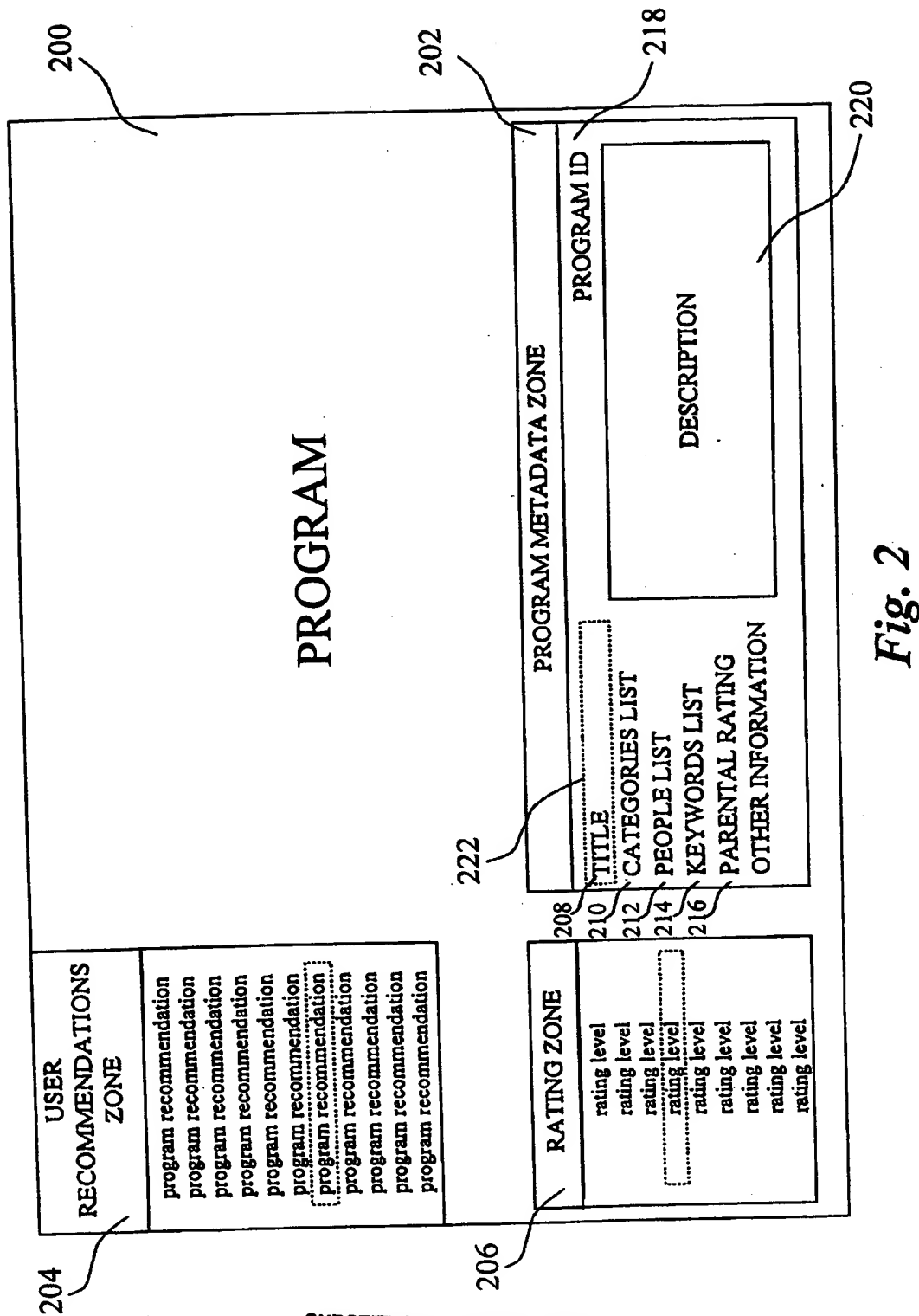
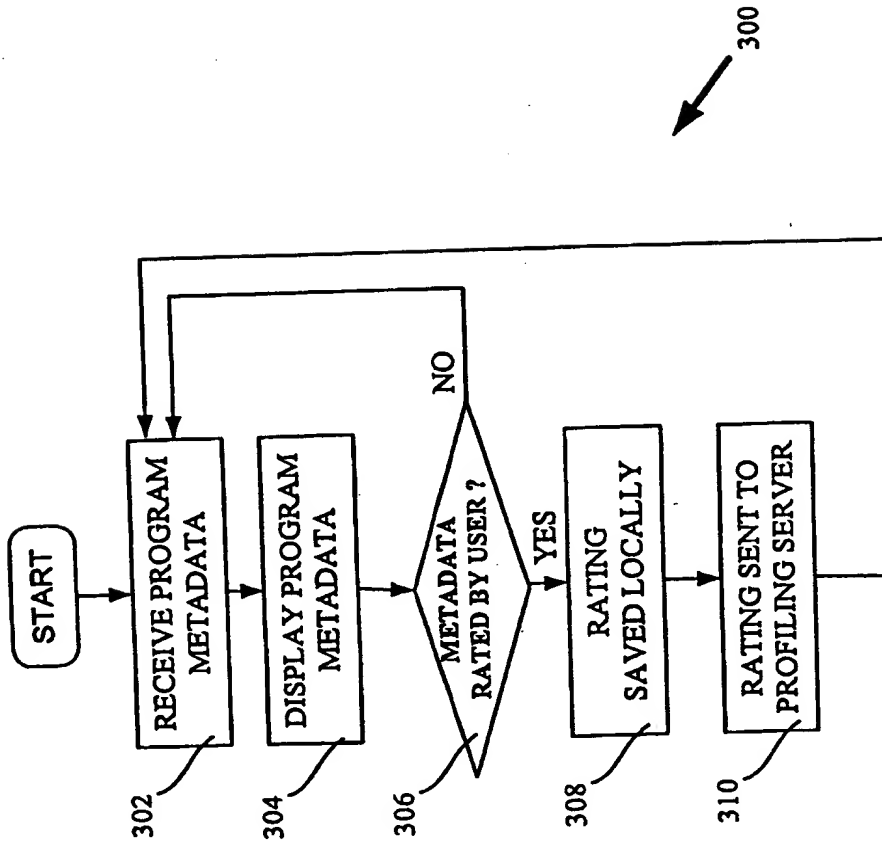
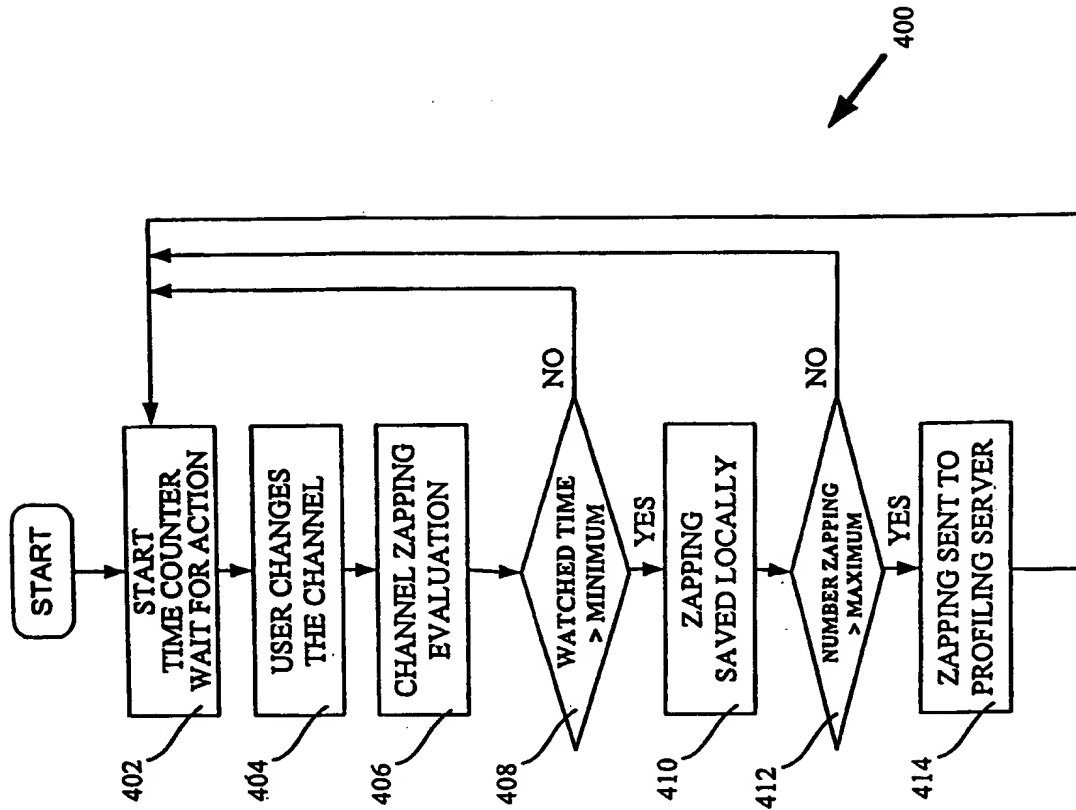


Fig. 2

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*Fig. 3*

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*Fig. 4*



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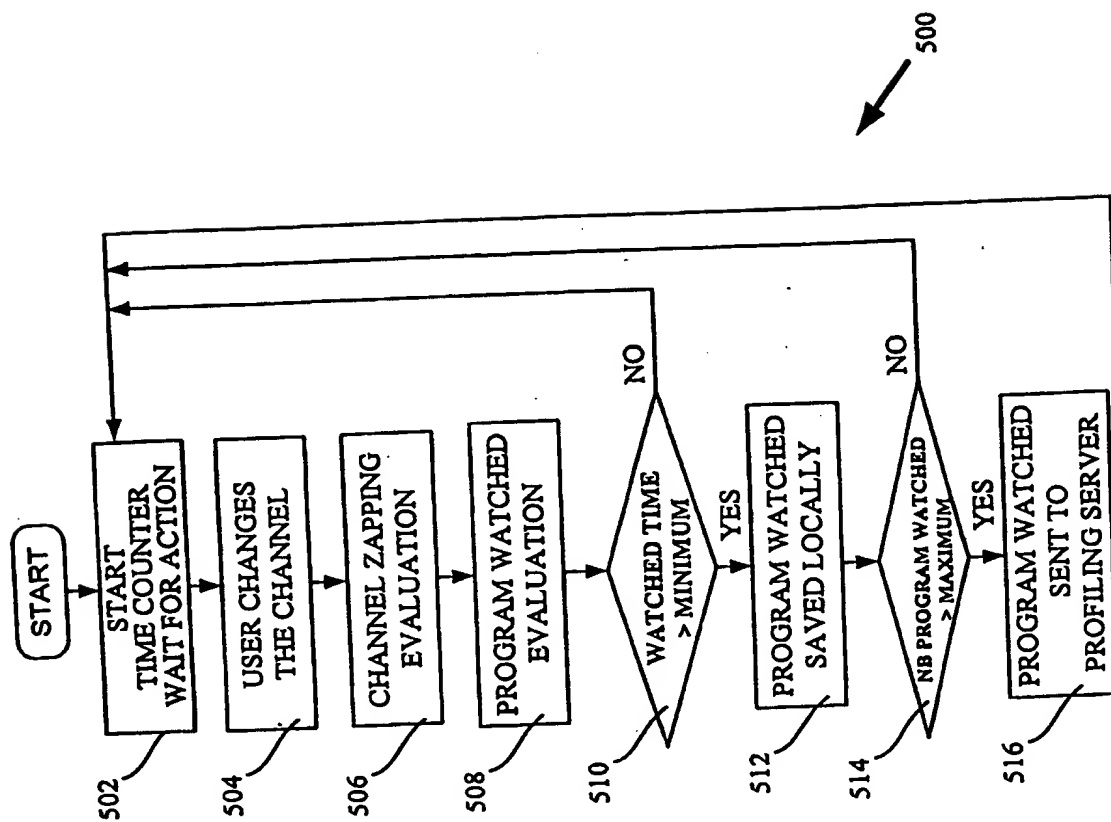


Fig. 5

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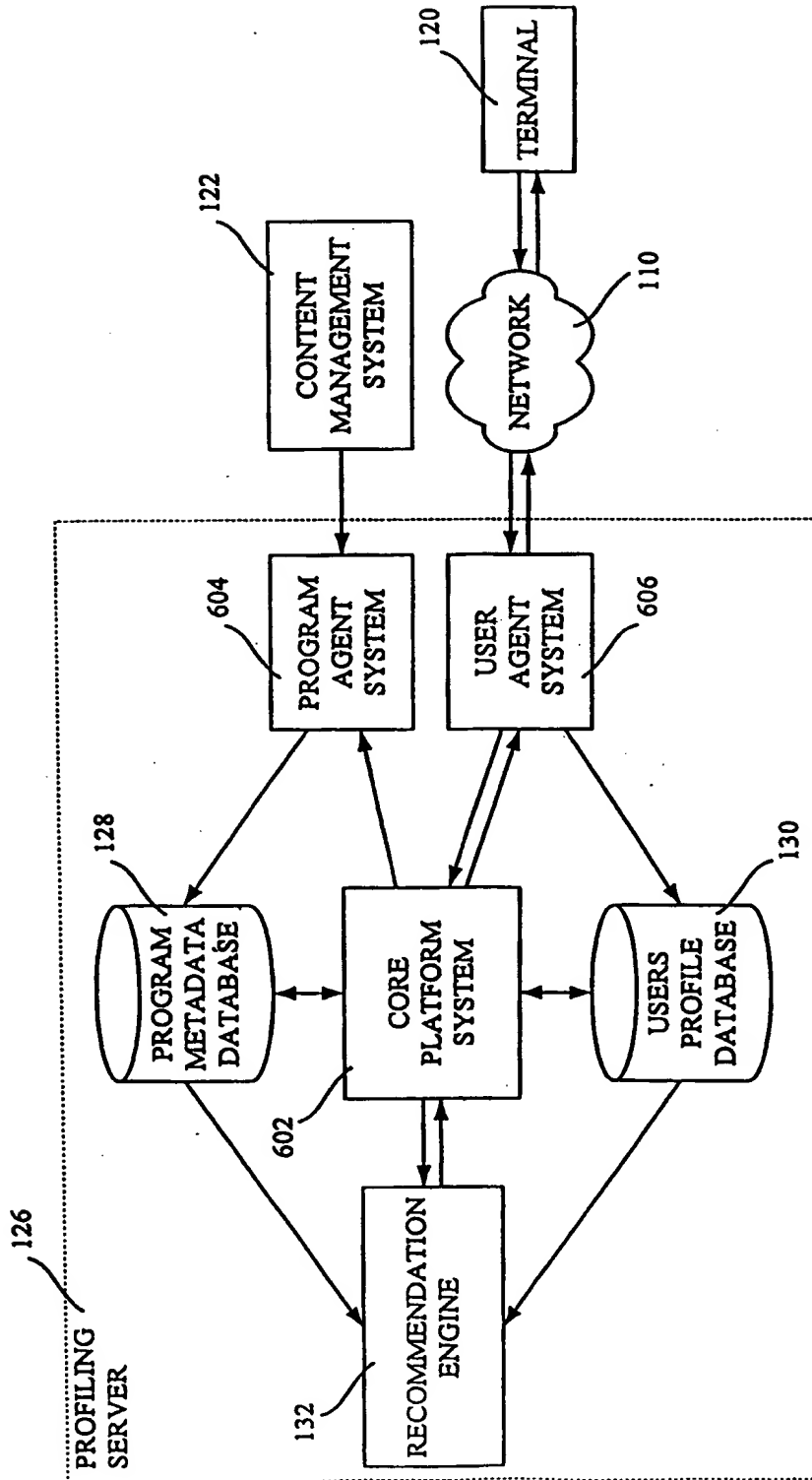


Fig. 6

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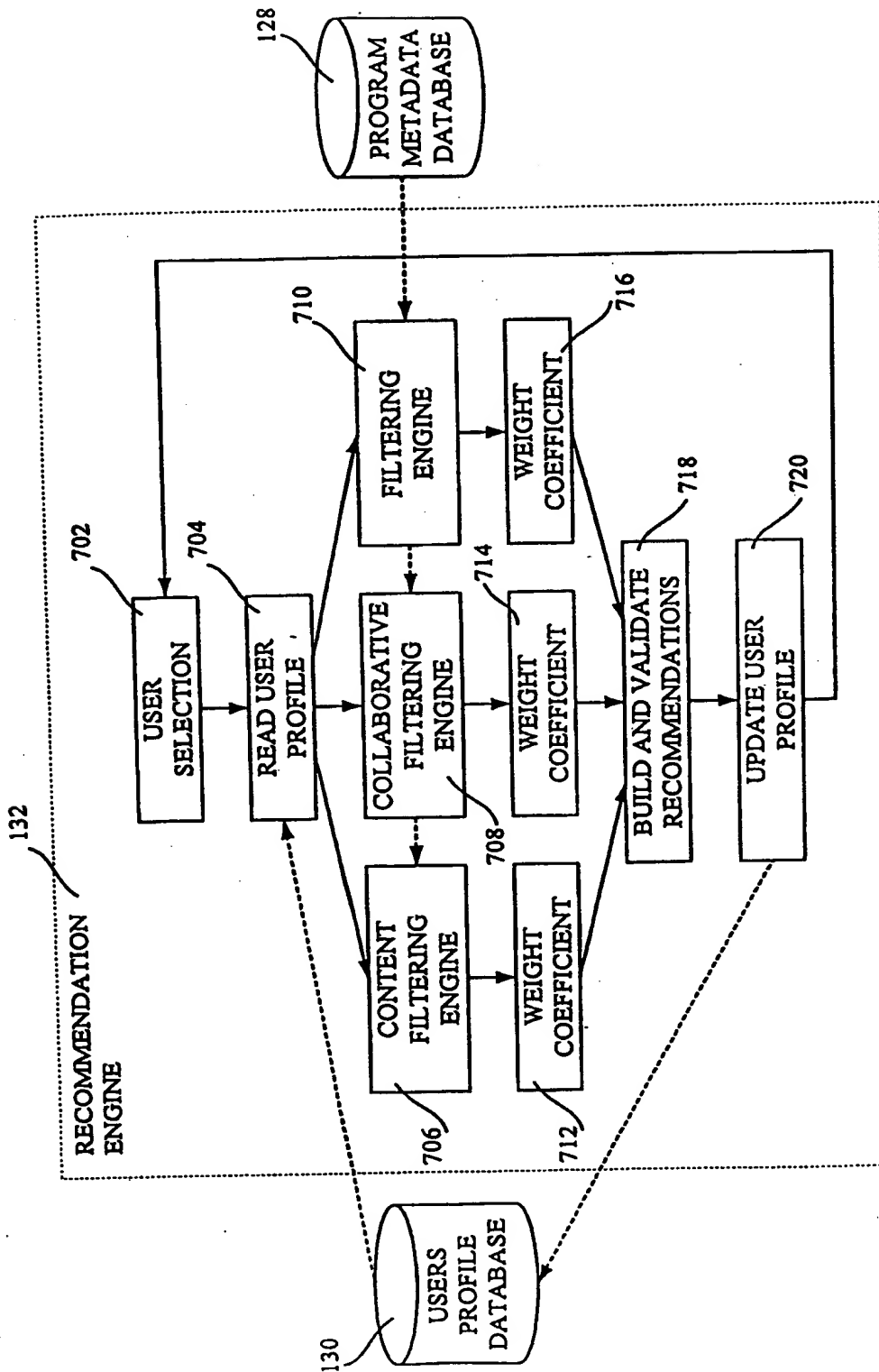


Fig. 7

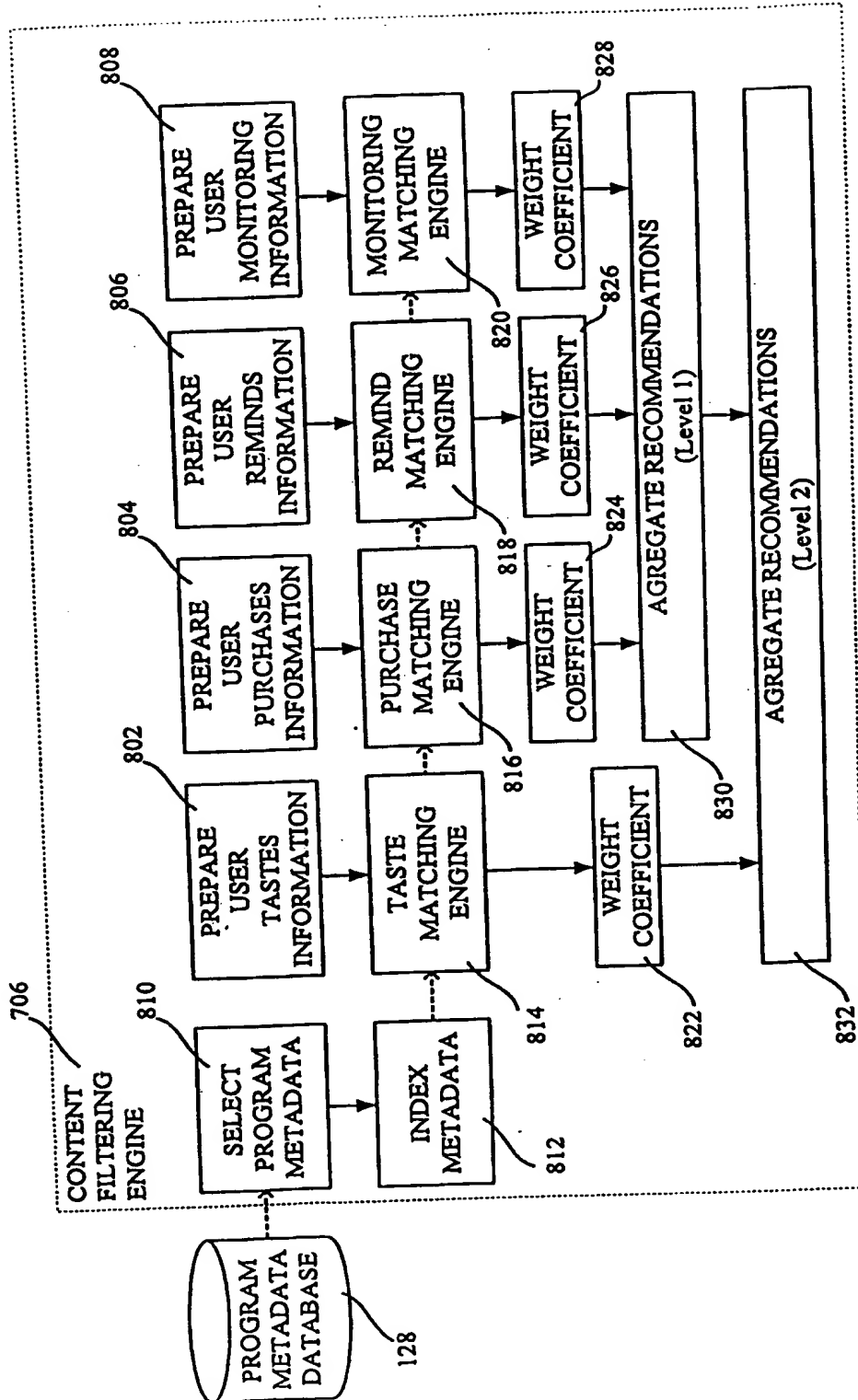


Fig. 8

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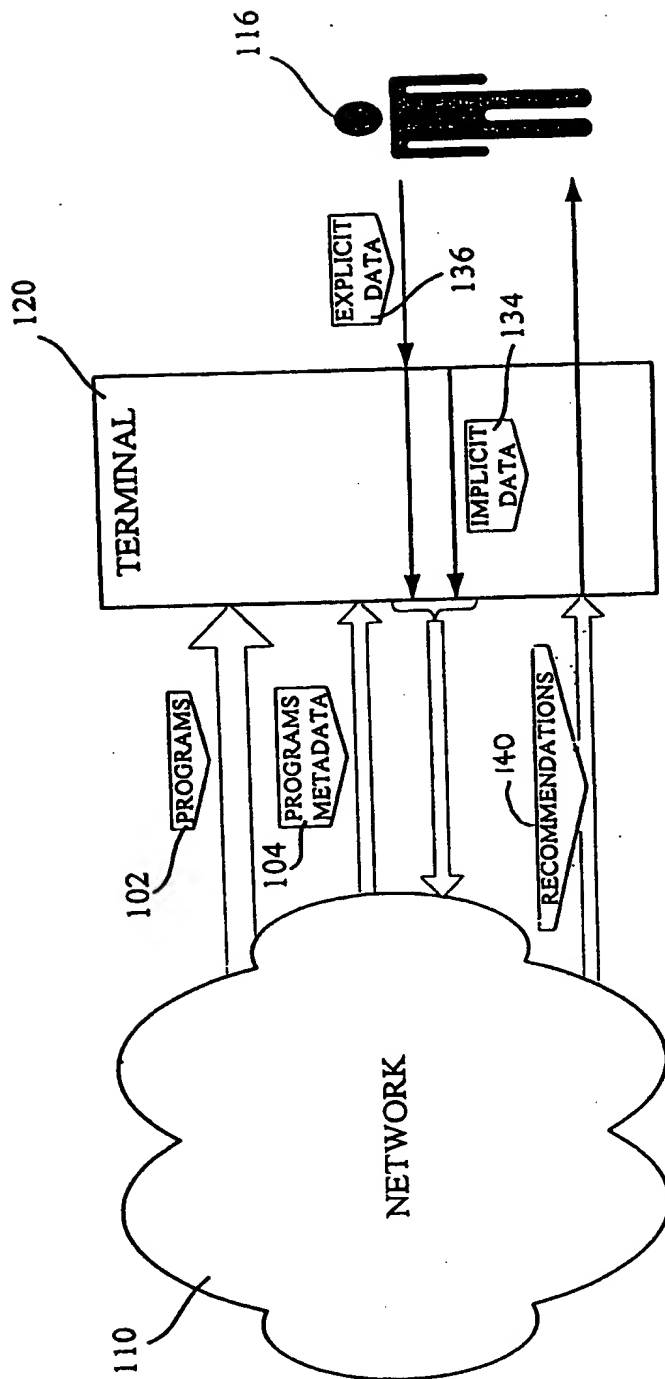


Fig. 9

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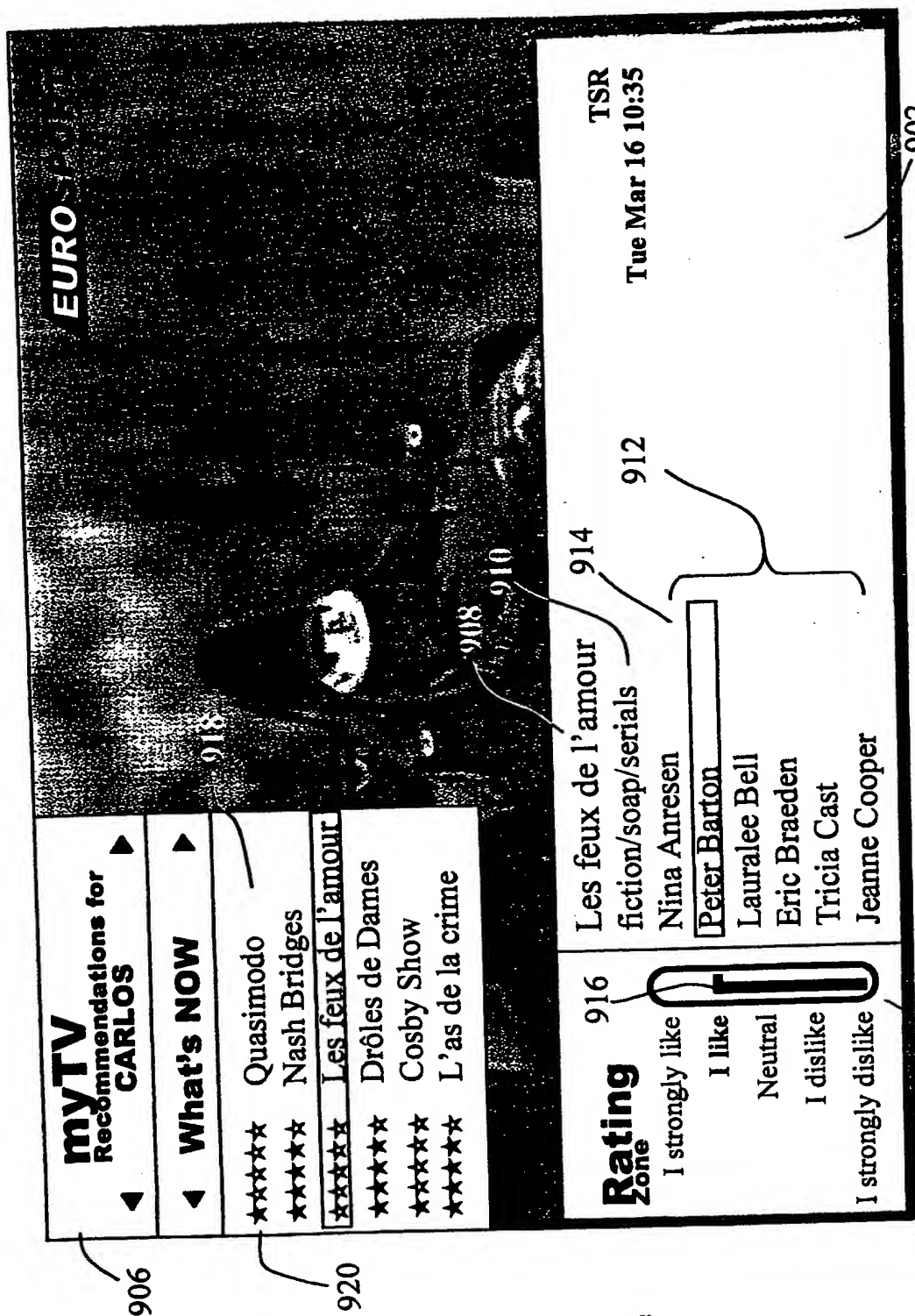


Fig. 10

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 00/01131

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 H04N7/173 H04N7/16

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 758 257 A (HERZ FREDERICK ET AL) 26 May 1998 (1998-05-26)	1,2,7-12
Y	column 11, line 45 - column 12, line 6 column 13, line 29 - line 54 column 19, line 6 - line 13 column 34, line 12 - line 23 column 40, line 11 - line 20  -/-	3-6

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
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- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

13 October 2000

Date of mailing of the international search report

20/10/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
 Fax: (+31-70) 340-3018

Authorized officer

Sindic, G

# INTERNATIONAL SEARCH REPORT

Int. J. Application No.

PCT/IB 00/01131

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	<p>NYGREN K ET AL: "An Agent System For Media On Demand Services"            PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON THE PRACTICAL APPLICATION OF INTELLIGENT AGENTS AND MULTI-AGENT TECHNOLOGY,            22 April 1996 (1996-04-22), pages 437-453, XP002086093            page 440, paragraph 1 - paragraph 2            page 441, paragraph 6            page 443, paragraph 3            page 445, paragraph 4 - paragraph 5            page 446, paragraph 3            page 447, paragraph 3            page 449, paragraph 2 - paragraph 4</p>	3-6
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International Application No

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- Duda, Carl R.  
Santa Barbara, California 93103 (US)
- Harrington, Jeffrey M.  
Brooklyn, New York 11215 (US)
- Ullman, Craig D.  
Brooklyn, New York 11201 (US)

(30) Priority: **29.09.1999 US 409305**

(71) Applicant: **ACTV, INC.**  
**New York, NY 10020 (US)**

(74) Representative: **Needle, Jacqueline  
W.H. BECK, GREENER & CO  
7 Stone Buildings  
Lincoln's Inn  
London WC2A 3SZ (GB)**

(72) Inventors:  
• Abato, Michael R.  
White Plains, New York 10605 (US)

(54) **Enhanced video programming system and method utilizing user profile information**

(57) A file specifying a "donut" of dynamic, hierarchical, shared user-profile information is maintained. The donut contains a user-profile, or acts as a key to a data repository containing such a user-profile, and the donut specifies user-profile information such as user characteristics, viewing preferences, hobbies, and spending habits. The donut may be stored in a network server or in a user's machine which is connectible to the

network. The donut is accessed by browser programs, associated web server programs, and other applications for use in routing content to the user associated with the donut. The donut implements a dynamic store of user profile-data which may be exchanged between the user and the server. This enables, for example, advertising to be tailored to the user based on the users responses to specific questions and/or on the user profile.

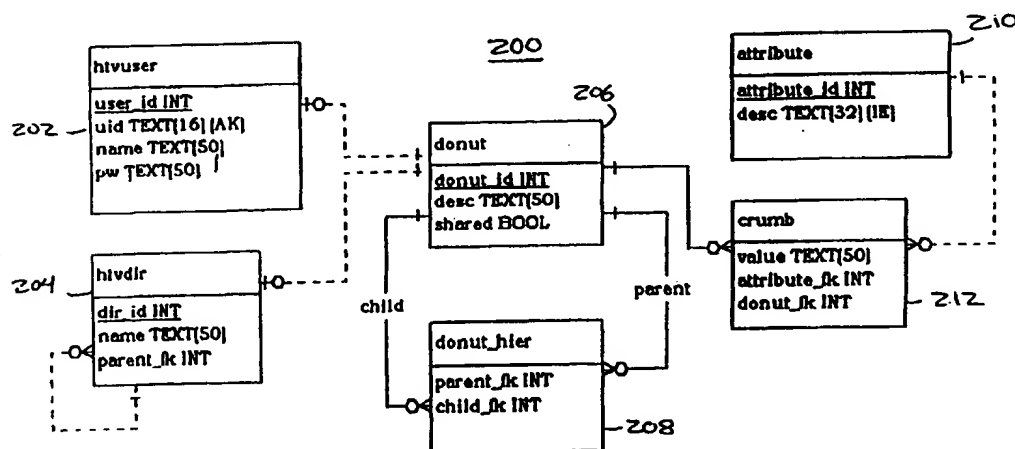


Figure 10

## Description

[0001] The present invention relates to a method, device and apparatus for compiling and maintaining, or accessing, information for routing and transmitting content to a machine via a network.

[0002] Computers have the capability to provide massive amounts of educational and entertainment information by way of the Internet. Currently, on-line systems offer a variety of different services to users, including news feeds, electronic databases (either searchable by user directly on the on-line system, or downloadable to the user's own computer), private message services, electronic newsletters, real time games for play by several users at the same time, and job placement services, to name a few. However, currently most on-line communications occur merely through text. This is in contrast to the audio/visual presentation of the alternative electronic medium, television. However, it is expected that as multi-media's incessant growth continues, audio/visual programs will proliferate and text will become less and less dominant in the on-line environment.

[0003] Even though these programs will be introduced, the Internet will remain essentially user unfriendly due to its very massiveness, organization, and randomness. Simply stated, there is no order or direction in the Internet. Specific pieces of information can be hard to find, and it is even harder to put that piece of information into a meaningful context.

[0004] Television, on the other hand, has been criticized for being a passive medium. Whilst interactive television systems have increased the level of user interaction, and thus, provided greater learning and entertainment opportunities, vast information resources such as databases are inaccessible from such a medium.

[0005] The present invention seeks to close the gap between video programming and the vast information resources of the Internet.

[0006] According to the first aspect of the present invention, there is provided a device for compiling and maintaining information for use in routing and transmitting content to a machine via a network, comprising:

a computer-readable medium including information for use in transmitting content to a machine;  
said medium comprising fields for specifying an identification of the machine, an address of the machine, and user-profile information, for use in determining a type of content to transmit to the machine, the user-profile information being specified in an hierarchical attribute value pair data structure.

[0007] A device of an embodiment of the invention can be used to change the nature of advertising. It enables pertinent information to be given to consumers automatically.

[0008] In a preferred embodiment of a device of the invention, which may be an article of manufacture, the computer-readable medium further specifies attributes of a user associated with the user-profile information and the hierarchical structure identifies hierarchical relationships among the attributes.

[0009] For example, the medium may specify information identifying the user, identifying preferences of the user, and/or identifying a room assigned to a user for a chat service. In this latter case, the information specified may identify members of the room for a chat service.

[0010] Additionally and/or alternatively, the medium may further specify an indication of a directory for use in obtaining instructions for routing the content.

[0011] Preferably, the medium includes user-profile information for use in selecting at least one of the following to transmit to the machine: information available via a Uniform Resource Identifier, video content, audio content, multi-media content, a particular video stream, or an executable object.

[0012] The medium preferably includes user-profile information for use in selectively transmitting survey questions to the user.

[0013] In an embodiment, the medium specifies the address of one or more of a personal computer, a television, a cable box, a satellite box, a video game console, and/or of a personal digital assistant.

[0014] According to a further aspect of the present invention there is provided a method for compiling and maintaining information for use in routing and transmitting content to a machine via a network by specifying particular fields within a computer-readable medium, the method comprising the steps of:

receiving information for use in generating a user profile;  
specifying in the medium, using the information, an identification of a machine, an address of the machine, and user-profile information for use in determining a type of content to transmit to the machine; and  
storing the user-profile information in an hierarchical attribute value pair data structure.

[0015] Preferably, the method further comprises the steps of:

specifying in the medium attributes of a user associated with the user-profile information; and  
specifying in the hierarchical structure hierarchical relationships among the attributes.

[0016] In embodiments, the method further comprises specifying in the medium information identifying the user, and/or specifying in the medium information identifying preferences of the user, and/or specifying in the medium information identifying a room assigned to a user for a chat service. In the latter case, the specifying step may further comprise specifying in the medium information identifying members of the room for the chat service.

[0017] The invention also extends to a method of accessing information for use in routing and transmitting content to a machine via a network, the method comprising the steps of:

establishing a network connection from a machine;  
accessing via the network connection an hierarchical attribute value pair data structure stored in a computer-readable medium; and  
transmitting information via the network connection for specifying in the data structure an identification of the machine, an address of the machine, and user-profile information for use in determining a type of content to transmit to the machine.

[0018] In preferred embodiments, the data structure is stored in storage means associated with the machine and/or associated with a server.

[0019] Preferably, the method further comprises dynamically updating the user-profile information. For example, the dynamically updating step may comprise monitoring activity of a user associated with the user-profile information; and updating the user-profile information based upon the monitored activity.

[0020] A method of an embodiment of the invention may include selecting, based upon the user-profile information, at least one of the following for transmission to the machine: information available via a Uniform Resource Identifier, video content, audio content, multimedia content, a particular video stream, or an executable object.

[0021] The present invention also extends to apparatus for accessing information for use in routing and transmitting content to a machine via a network, comprising:

network means establishing a network connection from a machine;  
access means for accessing via the network connection an hierarchical attribute value pair data structure stored in a computer-readable medium; and  
means for transmitting information via the network connection for specifying in the data structure an identification of the machine, an address of the machine, and user-profile information for use in determining a type of content to transmit to the machine.

[0022] The apparatus may have storage means associated with the machine for storing the data structure, and/or storage means associated with a server having the network connection with the machine, the storage means being arranged to store the data structure.

[0023] Embodiments of the present invention will hereinafter be described, by way of example, with reference to the accompanying drawings, in which;

Figure 1 is a diagram showing the receipt and decoding of video signals at a subscriber location using a method of the invention;

Figure 2 is a diagram showing an alternative embodiment to achieve the integration of Internet information with video content;

Figure 3 is a flow diagram of the basic software of the invention;

Figure 4 is a diagram showing an embodiment in which URLs are directly transmitted to a user;

Figure 5 shows an embodiment of a system comprising a digital cable box;

Figure 6 shows an embodiment of a system including a digital T.V.;

Figure 7 shows an example of a user interface;

Figure 8 shows an example of a display providing a user interface;

Figure 9 is a diagram showing an embodiment of a system having distributed communication servers;

Figure 10 illustrates a logical structure of a donut for implementing user-profile information; and

Figures 11A and 11 B show a flow chart of a process for generating and implementing donuts specifying user-profile information.

[0024] Figure 1 illustrates an embodiment of a computer based system for receiving a video program along with embedded uniform resource locators (URLs) which direct a user's computer 16 to address locations, or web sites, on the Internet 20 to retrieve related web pages. The web pages correspond to the video presentation. The particular video programming can be delivered in analog, digital or digitally compressed formats (e.g. MPEG2) via any transmission means, including satellite, cable, wire, television broadcast or sent via the web.

[0025] The video programming is preferably created at a centralized location, for example, as content creation 4 indicated in Figure 1, for distribution to subscribers. Program creation may be accomplished by any appropriate means. After a video program is created, uniform resource locators (URLs) are embedded. In one embodiment, the URLs are embedded into the vertical blanking interval of the video programming by a URL encoder 8, as shown in Figure 1. In this embodiment, the URLs are encoded onto eight fields of line 21 of the VBI. Line 21 is the line associated with close captioning, among other things. However, the URLs may additionally and/or alternatively be embedded in other fields of the VBI, in the horizontal portion of the video, as part of the audio channel, in any subcarrier to the video, or if the video is digital, in one of the data fields.

[0026] Although Figure 1 shows the video with the URLs broadcast over the same transmission line, the URLs may be sent down independently of the video program on a data channel. In this embodiment, the URLs may be forwarded to the remote sites either prior to initiation or during the program. Preferably, the URLs have associated time stamps which indicate to the subscriber stations when, during the video program, to display the particular web pages addressed by the URLs. Alternatively, the user can select when to call the particular web pages for display with the video program.

[0027] The particular information in line 21 is not part of the visual part of the program, and thus, is not perceptible to the human eye, thereby making it ideal to send data information to the users. Whilst the bandwidth capacity of line 21 is limited, as a system as described transmits only the URLs, and not full web pages, there is more than enough capacity. Furthermore, no additional hardware is necessary at the computer 16 to receive the video and retrieve the web pages.

[0028] Once the video program is created, it may be transmitted to user sites over any transmission means, including broadcast, cable, satellite, or Internet, and may reside on video servers. Furthermore, the video program, with or without embedded URLs, may be encoded onto storage means such as a video tape, for example of VHS or Beta format, or an optical disc such as CD or DVD, or any other medium.

[0029] Preferably, each receiver station comprises any Intel x86 machine (preferably a 486 processor, pentium processor, etc), an Apple Computer, UNIX or any other type of standard computer workstation. The local computer 16 is preferably connected to either a cable and/or broadcast television or to a local VCR or other video source. At each subscriber site, the local personal computer 16 preferably receives the cable transmission by cable connection on the back of the personal computer 16. The video/audio program may be processed for display on the computer screen using a PC card capable of displaying video signals on a computer monitor in an appropriate TV format such as PAL or NTSC. One example of a PC card is a WinTV card. In addition to the cable connection, there is the Internet 20 connection created concurrently with the cable connection.

[0030] The Internet 20 connection may be via high-speed line, RF, conventional modem or by way of two-way cable carrying the video programming. The local PC 16 has Internet access via, for example, an ASCII software mechanism. In an embodiment, at each subscriber site, an associated local URL decoder 12 extracts the URLs, preferably embedded in the vertical blanking interval, with the use of a suitable VBI decoder device. The URL decoder 12 may be either a stand-alone unit or a card which is implemented into the personal computer 16.

[0031] In the embodiment shown in Figure 2, the uniform resource locators (URLs) are encoded into the video as described above. Again, the URLs are preferably encoded onto eight fields of line 21 of the VBI, but may also be sent independently of the video. In this embodiment, a URL decoder 24 is located at the server site rather than at the subscriber location. When the decoder 24 receives the video program signal, it strips out the URL codes on line 21 of the VBI and delivers these codes independently to an Internet server 28. The URL code is then subsequently delivered over the Internet 20 to the user PC 16. Simultaneously, the video is broadcast over conventional broadcast or cable transmission means 36 to the user's personal computer 16.

[0032] The alternative shown in Figure 4, does not use the VBI. In this embodiment, the system runs an online service over the Internet 20. This service is in the form of an Internet web site 62 which provides a user-interface to a database 78 and to one or more associated data servers 90. The service provides member accounts to TV broadcasters 66 who sign up to use the illustrated system in conjunction with their broadcasts. Each member broadcaster will enter the service at their computer 70 through web browser software 74 using their member account by entering various identification and password information. Once within their account, the member will be provided with a graphical user interface for pre-scheduling URLs for transmission to users 118 over a direct Internet connection 94 at particular times of day. The same user interface, or a variation of it, can be used by broadcasters for live transmission 82 of URLs to users at the same time as a broadcast 86.

[0033] One example of this interface might be a scheduling calendar (daily, weekly, monthly, yearly) in which the broadcaster 66 may allocate time periods which coincide with their broadcasts 86, and during which they will send out URLs to their users to link to web pages. For each time period (for example, a particular hour long period during the day) determined by the broadcaster 66 to be a broadcast period (a period during which they want to transmit URLs that correspond to a television show being broadcast from their TV broadcast facility 110 to the external TV 114 of the user 118 at that time), the broadcaster 66 may then enter a series of URLs into an associated file ("Link File") for transmission over the Internet 20 at that time. This Link File may have a user interface such as a spreadsheet, table,

or list, or it may be simply a tab-delimited or paragraph-delimited text-file. As an example, each of the records in the Link File consists of a data structure which may contain information such as:

(<timecode>,<URL>,<label or title>,<additional information>,<additional information>,...)

[0034] The above data structure is just one example. The records in the Link File preferably specify the time, Internet address (i.e. URL), label (such as an associated name), and some optional additional information, for each web page the broadcaster 66 desires to launch during a show.

[0035] When a broadcaster 66 modifies their calendar and/or the Link File associated with any given time period(s) in their calendar, this information is saved into the database 78 which is attached to the site 62. Each broadcaster 66 may maintain multiple calendars in the database 78 if they broadcast in different time zones, for example.

[0036] The database 78 provides the Link File records for upcoming time periods to a server 90, which may be one server or a distributed network of server programs on multiple computers across the network, to be utilized for scaling to large national or global audiences. The server 90 provides the Link File records, including the URLs, to the user's personal computer 16, which is connected via a network. Examples of possible networks include the public Internet 94, a direct private network, or even a wireless network.

[0037] One feature of the embodiment illustrated in Figure 4 is that one or more broadcasters 66 may utilize the same schedule in the database 78 for their own broadcasts 86 or during the same broadcast. For example, a network broadcaster may develop a master schedule and various affiliate broadcasters may subscribe to that schedule or copy it (in the database) and add or delete specific URLs in the schedule for their local audiences or unique programming. This scheme enables affiliates to insert URLs for local advertisers or local subjects into a sequence of more general URLs provided by their network broadcaster 66. In other words, the affiliate can add links that ride on the network feed and then redistribute it to their local audiences.

[0038] The system of Figure 4 also enables personalization in the form of unique series of URLs specific to each user's unique profile, which are directly sent over the Internet 20 to each user's specific client software 106. This can be achieved from the broadcaster 66 to each individual user 118, or to particular collections of users. To accomplish personalization, the service may send a different stream of URLs to each user's client software program 106. The stream of URLs sent depends upon a user profile stored in the database 78 or the client software program 106, a user profile which is built on demand or over time for each user 118 based on criteria such as the location of the user, choices the user makes while using a client software program 106, choices the broadcaster 66 makes during a broadcast 86, or automatic choices made by an algorithm (such as a filter) residing on the service 62. Personalization enables each user to receive URLs which are uniquely relevant to their interests, demographics, history, or behaviour in the system.

[0039] Once the URLs have reached the personal computer 16, the operation of all of the systems shown in Figures 1, 2 and 4 is similar.

[0040] In one embodiment, a JAVA enabled browser 98 as well as specialized software 106 are installed on the computer 16. The JAVA enabled browser 98 allows the computer 16 to retrieve the web pages 102 and is presently the preferred software, as it is platform independent, and thus, enables efficient and flexible transfer of programs, images, etc., over the Internet 20. The specialized interface software 106 (hereinafter, "client software") acts as an interface between the video programming and the Internet functions. The client software 106 retrieves URLs from the video program (embodiment of Figure 1) or directly from the Internet connection (embodiments of Figures 2 and 4), interprets these URLs and directs the JAVA enabled browser 98 to retrieve the particular relevant web pages 102. The client software 106 also synchronizes web pages to the video content for display on the user's computer 16, as shown in Figures 3 and 4 and explained in more detail below.

[0041] As explained above, the URLs may be encoded and embedded into the video signal by inserting them into the vertical blanking interval (VBI).

[0042] Alternatively, the URLs may be entered by member TV broadcasters 66 along with specified times for transmitting the URLs to the user. At the appropriate times, the URLs are sent directly over the Internet to the user's PC 16 via the client software 106 over a direct point-to-point or multicasting connection.

[0043] The system may have the capability to detect identical URLs sent directly after one another and to cause the browser not to fetch URLs in these particular cases. As shown in Figure 3, once the URL code is received at the computer, the client software 106 first interprets the URL and determines in step 42 whether the particular URL has been received previously. If it has already been received, the next received URL is interpreted for determination of prior receipt. If the particular URL has not been detected before, the software checks for misspelling in step 46 and any other errors, and if errors exist, corrects these particular errors. Once again, it is determined whether the URL has been previously detected. If it has, the next URL is accessed in step 38. If the URL has not been detected, the specific URL is added to the URL list in step 54. The specific URL is then sent to the web browser, preferably a JAVA enabled browser 98. Upon receipt of the URL, the browser 98, in step 58, will access the web site address 122 (Figure 4) indicated by the URL and retrieve the cited web page(s) 102 via the Internet.

[0044] Viewers can view the integrated presentation in the following manner. As mentioned above, the video signal is processed and displayed on a video window on the PC screen using a WinTV card, for example. The corresponding

audio is forwarded to the audio card and sent to the PC speakers.

[0045] The retrieved web pages 102, referenced by the URL, are optionally time stamped to be displayed on the computer screen when predetermined related video content is displayed in the video window, thus enhancing the video presentation by providing in-depth information related to the video content thereto. Another section on the screen is also preferably used to represent an operational control panel. This control panel provides a list of the URLs which have been broadcast and correspondingly received by the computer 16. This control panel is updated to add a URL code each time a new URL code is received by the PC 16. This list gives the subscriber the flexibility to go back and retrieve particularly informative or interesting web pages that have already been displayed earlier in the program, or alternatively, to print them out for future reference. Furthermore, the list may include URLs referring to web pages not displayed with the broadcast program, but which provide further information on a certain topic of interest to the viewer.

[0046] In an example, a viewer may begin watching a musical video featuring a band. As the video is received by the PC 16, URLs are either being received with the video signal or are being received directly via the Internet 20 or another data channel, and are interpreted by the client software 106. Upon direction and command, the JAVA enabled browser 98 retrieves particular web pages 102 from Internet 20 web sites identified in the URLs. These web pages 102 are then displayed on the video screen at particular times. So, for example, whilst the viewer is watching the music video, biographical information on the band may also be displayed adjacent to the video window. Web pages 102 may also include an upcoming concert schedule, and/or audio clips of the band's music may be downloaded from the Internet 20.

[0047] As another example, a user may be watching a program relating to financial news. Whilst the narrator is shown discussing high tech stocks, web pages corresponding to detailed financial performance information on high tech stocks, environment and characteristics may be displayed with the video on the computer screen. If the personalization features are included, web pages associated with a particular user's stock may be fetched and displayed on the computer screen with the video program. When the program narrator switches to a discussion on the weekly performance of the Dow Jones, web pages presenting related financial performance information may be simultaneously displayed.

[0048] A user may view the interactive program using a television set 114 or other display monitor in conjunction with the display screen of the personal computer 16. In this case, the relevant web pages are shown on the personal computer 16 whilst the video program is displayed on the television monitor 114. In this alternative, a cable set top box receives the television program from the multi-channel cable. The personal computer 16 also receives the video program from the multi-channel cable and extracts the URLs, embedded in the vertical blanking interval of the video signal or directly transmitted 94 over the Internet 20. The client software 106 extracts the URLs and retrieves the particular web pages as described above. The web pages are then synchronized with the particular video frames and presented to the user. It is understood that a hyperlink may exist on the web site that will allow the user to automatically load the client software and call up the specific television channel referenced in the web site. For example, someone browsing the Internet 20 may come upon a major television network's web site. It is possible then to scroll to an interesting story and then to click on an hyperlink to turn on the software which tunes the TV window to the network.

[0049] Instead of receiving the video program from a transmission means, the video program may be addressed directly from the user site if the video program, with or without embedded URLs, has been stored on appropriate means. The storage means may be a videotape in any format, such as VHS or Beta, or an optical disc in any format, such as DVD or CD-ROM. In this case, the user PC 16 and/or television 114 are connected to a video tape player, a disc drive, or other appropriate device.

[0050] Figures 5 and 6 show two alternative examples of systems which may be employed. As shown in Figure 5, a user may view an interactive program using a television set 18 or other display monitor in conjunction with a digital cable box 140. In this case, the digital cable box 140 performs the functions of the personal computer 16 shown in Figures 1, 2 and 4, and the client software is stored in memory in the digital cable box 140. In one embodiment, the digital cable box 140 includes two tuners, thus allowing both the web page and the video program to be simultaneously viewed on the same screen. If video and web stream, however, are carried on one channel, then only one tuner is necessary.

[0051] The client software retrieves URLs from the received video program, directly from the Internet connection 20 or via a separate data channel, interprets these URLs and directs the web enabled browser to retrieve the particular relevant web pages, and synchronizes the retrieved web pages to the video content for display on the television 18. The relevant web pages are preferably shown in one frame of the television 18 while the video program is displayed in another frame. Alternatively, the web page can replace the video program on the display.

[0052] In this embodiment, the digital cable set top box 140 receives the television program from the multi-channel cable. The URLs can be encoded into the digital program channel using MPEG1, MPEG2, MPEG4, MPEG7 or any other compression video scheme. Alternatively, the URLs can be transmitted to the digital cable boxes 140 from an Internet server 148. The digital cable box 140 decodes the URLs from the digital video signal or directly transmitted over the Internet 20. The client software decodes the URLs and retrieves the particular web pages as described above. Preferably, the web pages are synchronized with the particular video frames and presented to the user.



[0053] As with all the embodiments described above, instead of receiving the video program from a transmission means, the video program may be addressed directly from a local video source 144 if the video program, with or without embedded URLs, is stored on a storage means such as a video tape or optical disc. In this embodiment, the digital cable box 140 is connected to a VCR, disc drive or other appropriate device.

5 [0054] Figure 6 illustrates an embodiment where a digital TV 152 is the remote reception unit and performs the functions of the personal computer, shown in Figures 1, 2 and 4, and the digital cable box 140 shown in Figure 5. A processor means and memory are incorporated in the digital TV 152, and the client software and web browser software are implemented in memory in the digital TV 152. All of the functions described above with reference to the other

10 [0055] Although the digital cable box/TV 140, 18 and digital TV 152, shown in Figures 5 and 6, are incorporated into the embodiment of Figure 1, in substitution for the PC 16, they may also be substituted for the PC 16 shown in Figures 2 and 4.

[0056] A user may view the video and web content on one screen (in two windows), or with the video on one display screen and the web content on a separate display monitor. Alternatively, a user may access the video or web content separately. Thus, a user may branch from video to web content and vice versa.

15 [0057] The systems described herein are well-suited to the education environment. Thus, students and teachers may access one or more web servers. Software components including instructor and student user software, authoring software and database assessment software are provided. An instructor may, for example, use content creation software on a personal computer to easily integrate into the curriculum current information published on the web through an interface 156 shown in Figure 7. The instructor creates a playlist (i.e. linkfile) 160, the playlist 160 comprising a list of web pages, text notes and questions. The web sites and questions are set out in a predetermined order and can be assigned times. Preferably, the URLs identifying the web site and time stamps are sent automatically to the desktop of each student in the virtual community, either during a playback of a pre-recorded program or during a live event.

20 [0058] At each of the student workstations, the program is directed by the playlist 160. In other words, the playlist 160 provides the structure for the program. At predetermined times as indicated by the playlist 160, the browser will fetch and display a web page in a frame on the computer screen. Because program events can be set up in this manner at predetermined times, the entire program and playlist can be prerecorded and stored in a web database for later access by students.

25 [0059] It will be appreciated that the students and the instructor may be located anywhere, as long as they are all connected to the web. Because a server controls the program, the instructor output comes from the server and the student workstations are automatically updated by the web server.

30 [0060] This educational embodiment integrates web content and other media with collaborative groupware functionality to create an interactive environment for students and teachers. The student may receive a traditional video lesson through a frame in his or her web browser, or from a television. Separate frames may be simultaneously provided as shown in Figure 8, which shows the browser displaying: web pages 176 automatically delivered to each student's desktop with information or exercises that complement the video presentation; a chat dialogue frame 168 for conversing with the instructor and/or other students online; and an interactive playlist 164 of web pages and questions comprising the lesson.

35 [0061] In the student interface of Figure 8, each student may perform a virtual experiment, for example, during a physics lesson to learn about gravity. In addition, the students may converse with one another and with the instructor using the chat dialogue frame 168. They may also send web pages to one another and provide answers to questions from the teacher via the chat dialogue frame 168 of the student interface 176. With the chat feature, students may break into subgroups for collaborative learning. Whenever a student in the group sends a message, the message is sent to the Internet server 20 and every other student in the subgroup receives and views the message in their chat dialogue frame 168.

40 [0062] The instructor, however, may retain control over the chat feature. For example, the instructor may terminate the chat feature or web push to terminate unruly on-line conversations or the sending of web pages by students.

45 [0063] The systems described herein are more powerful than conventional distance learning systems as they allow the instructor to freely and conveniently exercise almost any type of testing strategy. The instructor may test students using a combination of the chat dialogue feature and web pages. For example, multiple choice questions and short answer questions can appear in the chat window 168. Essay questions, requiring longer answers, become web pages. As mentioned above, students can perform virtual experiments on-line. Once the instructor's personal computer receives student answers, student scoring may be presented to the instructor in any format including tables, charts, diagrams, bar graphs, etc. The instructor, thus, may analyze the results and has the capability of providing real-time

50 feedback to the students.

55 [0064] Students may also receive individualized feedback via branched interactive audio, video and/or graphics responses. For example, the workstation may branch to a particular audio response, preferably prerecorded in the instructor's own voice, based on the student response to a multiple-choice question. A plurality of potential audio re-

sponses may be made available at the student's workstation, for example, by a method as described in US patent No. 5,537,141. Additionally and/or alternatively, personalized video, audio and graphics segments may be delivered and displayed to the student based on a student answer or personal profile, for example, in a manner as described in US patent No. 5,724,091.

5 [0065] Responses to student answers may be more substantive using a memory feature comprising an algorithm which selects an interactive response to the user based not only on the student's current answer selection, but also on the student's previous responses. The algorithm, preferably stored in memory at each student's workstation and under processor control, selects an output interactive response based on student responses. In an example, a student who gets three or more answers in sequence right receives a more difficult question. However, a student who fails to

10 correctly answer one or more of the three questions receives an easier question.  
[0066] The system illustrated in Figure 9 is capable of servicing large numbers of users, for example, several schools. As shown, communications servers 180 distribute and route message across a LAN, WAN and the Internet. At the heart of the system is a group database server 184, and this is surrounded by several communication servers 180 which each serve an area 192. Each communication server 180 is surrounded by squares representing user stations

15 188. The communication servers 180 are organized in node relationships with one another.  
[0067] Each node is responsible for serving an area 192. An area 192 is defined as a virtual location serviced by a single communication server 180 (or "com server"). An area 192 may be a single school, an office, or may consist of several actual physical locations. The defining characteristic of an area 192 is that messages sent from one member of an area 192 to another need not be routed outside of the servicing com server 180.

20 [0068] An area member is analogous to the frequently used term "user". For example, a "user" may be a student in an educational environment.

[0069] The distributed communication system shown in Figure 9 permits the dynamic addition of communication servers 180 within a group with little or no administrative tasks as well as the addition of groups within an overall communications network. A communication server group consists of several defined virtual areas 192 (preferably, consisting of no more than 250 members each), each area 192 serviced by a single com server 180. This system

25 allows members of one area 192, or group, to easily communicate with members of another area 192 or group without any configuration changes.  
[0070] In the past, service of very large numbers of users has required large expensive servers and networks. Furthermore, as the user base increased, performance suffered and the hardware had to be upgraded to service the

30 demand.  
[0071] The distributed communication system allows the same, relatively inexpensive, machines to serve an ever-increasing user base. This is accomplished by routing messages from one server to another when necessary following substantially the same core pattern as IP routing and DNS lookups. If a message is for a member not belonging to the current area 192 or group, the message is routed through the distributed communication system until its destination, or someone who knows the destination and can deliver the message, is found. The destination may be cached so

35 subsequent messages for that member or group may be more efficiently delivered.  
[0072] Referring to Figure 9, if a message is posted by member "A" and is intended only for the members of group 1, the message never leaves the area 1 com server. However, if the message is intended for members of area 1 and for members of area 2, the area 1 com server forwards the message to the group database server 184. The message

40 is broadcast to the members of area 1 and tagged in the group database server 184 as belonging to area 2. The message is then routed to area 2 and broadcast to area 2 members. With this technique, any member may potentially send a message to any other member. If the area com server 180 does not recognize the destination, the message is forwarded up the line. Each com server 180 does not need to know about any other server 180. Messages are routed until they delivered. If undeliverable, the original sender is notified.

45 [0073] New areas 192 can be added on the fly. When a new com server 180 is added to the network, it registers itself with the database application. Henceforth, any message destined for the new area 192 may be routed properly without altering the other area servers 180.

[0074] This method and system works for global messages or for user to user messages. Furthermore, new groups may also be dynamically added. Once added, each new group database server 184 registers itself with the existing database servers 184. This distribution of load permits nearly unlimited expansion with existing software and hardware.

50 Each server manages a finite number of members, cumulatively serving a growing community.  
[0075] Users need not be informed as to the particular com server 180 they should connect to. Members are directed to a single URL. The selection of the server for user connection is determined by load balancing software. In this manner, the network may appear to be a global network of servers or simply a local classroom.

55 [0076] The architecture described, which uses database servers as routing gateways, enables the system to serve with minimum administration and configuration and with lower end, cost-effective hardware.

[0077] In accordance with an embodiment of the invention, a "donut" of dynamic, hierarchical, shared user-profile information may be used. A donut may specify, for example, user characteristics, viewing preferences, hobbies, and

spending habits as a user profile. The donut contains a user profile or acts as a key to a data repository containing a user profile, and the donut may be stored in an appropriate store in a suitable manner. For example, a donut may be stored in a file-type structure in a computer-readable memory. The donut may be accessed by browser programs, associated web server programs, and/or other applications for use in routing content to a user's machine associated with the donut. The user machine may include a wide variety of devices such as, for example, a personal computer, a television, a cable box, a satellite box, video game console, and/or a personal digital assistant.

[0078] Browser programs typically include a file created by a web server to locally store data and track web sites, identified by URLs, accessed by the user through the browser program. These files are referred to as cookie files, and contain a range of URLs for which they are valid. When the browser encounters the URLs again, it sends the corresponding cookie files to the web server identified by the URLs.

[0079] In an embodiment of the invention, browsers may access a donut file, and/or a database structure storing donuts, and web servers may include files or other database structures for storing copies of the donut. The donut file for a particular user is typically stored only on the server, but it may be stored locally on the user's machine, or on both the server and the user's machine. The donut implements a dynamic store of shared profile data which may be exchanged between client and server, and may have the flexibility to collect and process that data in three ways: client-side evaluation, http-based server-side evaluation, and network-based server-side evaluation. The donut has an advantage over a cookie file in that the donut file is database driven and typically stored on a server, preventing a user from deleting or otherwise tampering with the donut file. Cookie files, in comparison, are stored locally on a user's machine and still access the user's donut file and receive content based upon the donut file.

[0080] A donut, more specifically, is an hierarchical attribute value pair data structure including a collection of crumbs. A crumb is the smallest unit of data corresponding to a meaning value pair associated with a particular donut. For example, a user's age would be a crumb associated with the user's primary donut. The donut data structure includes names plus associated crumbs. At the top level of the hierarchy, a top donut is associated with a user, a chat room, a network service, or other appropriate business entity or service. Each donut contains a set of crumbs and a set of sub-donuts.

[0081] A sub donut is a donut associated with another donut rather than an external entity such as, for example, a user. An example of a sub-donut is a user's address. The user's address references the user's primary donut and is stored in a sub-donut, and the sub-donut contains crumbs for each piece of information in the address. Donuts are stored with hierarchical relationships, meaning that a donut can have associated sub-donuts and the sub-donuts can also each have associated sub-donuts. The donut may thus have many levels of sub-donuts within its hierarchical structure.

[0082] Some donuts are owned by only one parent donut. Other donuts are shared among several or many parent donuts. These shared donuts profile a business entity, such as an individual program, which is common to all. An example includes members of the same chat room. This provides a way to identify a group of users for a chat service. Also, by sharing the donut a user need not enter a new profile for using different services; the services share and use the one donut.

[0083] Figure 10 is a diagram of logical structure 200 of a donut for implementing user-profile information. This structure may be stored on a computer-readable medium, such as a memory, for access by an associated machine. The term "donut" is used only as a label and refers to information residing on a server and accessible by a client for use in pushing or assigning particular content to the client.

[0084] Structure 200 uses database tables for storing and maintaining the user-profile information, which includes any type of information identifying a user or corresponding client machine. Structure 200 includes a user table 202, identifying a particular network user, and each user would typically be identified by a separate table. Table 202 may also include information identifying each user's name and an associated password and identification (ID). A directory table 204 maintains a directory listing of the network users.

[0085] A separate donut table 206 maintains user-profile information for a particular user. Donut table 206 is also associated with the corresponding table 202 for that user and with the directory table 204. Donut table 206 is also associated with a donut hierarchy table 208, which identifies and maintains hierarchical relationships for table 206. Each donut table 206 may include an associated crumb table 212 for use in identifying and maintaining particular attributes for the user-profile information. An associated attribute table 210 stores and maintains the information for those attributes.

[0086] The user profile may contain a wide variety of information concerning user characteristics for use in determining content to push to a user. As further explained below, the content may include any type of information such as video, audio, graphics, text, and multimedia content. Examples of content to be selectively pushed to the user based upon the user-profile information include, but are not limited to, the following: advertisements; player profiles for sporting events; music or other audio information; icons representing particular services; surveys; and program suggestions. Also, when a video program provides different video streams for different camera angles, such as a sporting event, the particular camera angle may be chosen based upon the user profile. In addition, particular drama presentations

provide different video streams for various plot changes, and a video stream for a particular plot to be displayed to a user may be chosen based upon the user profile.

[0087] The surveys may involve selectively transmitting questions to a user based upon the user's donut. The user's answers to the questions may be used to further update the donut. As an example of survey content, consider an automobile manufacturer as an advertiser that has determined that the answers to ten questions, asked in a specific order, are vital to determining how the manufacturer is going to market to a particular user. In this example, the server or network uses the donut to maintain what questions have been answered and which have not been answered. The donut can be utilized to determine which of the ten possible questions should be pushed to the user when the network determines, according to a particular schedule, that it is time for the manufacturer's survey to be pushed to the user.

[0088] This example further illustrates how individual advertising may be selected for particular users. The answers to the surveys may be used to provide a second level of information within an advertisement pushed to a particular user. The network may use demographic data in the user's donut, for example, to determine which advertisement and survey to push to the user. The user's answers to the questions in the survey may be used to push additional advertisements to the user or additional content for the advertisement already pushed. Also, the network may tailor a survey to a particular user by selecting additional questions for the survey, and an order of presentation of the questions, based upon the user's answers. Accordingly, the network may dynamically modify and update a user's donut to further fine-tune the process of selecting particular content to push to the user based upon the user's donut.

[0089] An execution environment for donuts may be implemented with an easily programmed JAVA module, an example of which is provided in Table 1 illustrating template-based code, generated by a graphical user interface (GUI). This module may be implemented as an application program interface (API) on a user's machine for accessing the user's donut file on a server. If the user's machine does not contain such a module, the user's machine may download it as a JAVA Archive (JAR) file for local execution.

Table 1

---

```

import actv.nub.*;
public class Pilot Yankees implements Processor {
    public void process (Nub,nub,Donut client, Donut action)
        throws NubException
    {
        if (client.check("OWNS_PILOT")&&
            action.getValue("FAN_OF").equals(Yankees")) {
            nub.change("content",YankeePilotChallenge);
        }
    }
}

```

---

[0090] The module in Table 1 can obtain crumb values from a donut service, branch on those values and other conditions, set existing crumb values, and create new crumbs as desired. Additionally, the module can interact directly with systems such as a distributed community network for additional functionality, including dynamic assignment to

content and advertising push channels. An example of a distributed community network is described in US patent application No. 09/396693 filed 15th September 1999. The donut may be used with other types of networks as well.

[0091] A module processing a donut can execute in three modes: as an http servlet connected directly to a database for donut persistence; as a service responding to requests coming through a distributed community network and un-  
 5 connected to a database for donut persistence; and on the client machine, which has direct access to user input, but uses the donut persistence by proxy through a distributed community network.

[0092] Figures 11 A and 11 B show a flow chart of a process 220 for generating and implementing donuts specifying user-profile information. Process 220 may be implemented in software modules on a machine such as a web server in the exemplary network described above. In the process 220, a user attempts to log onto the network (step 222). In  
 10 response, the server determines if a donut exists in the database for this user (step 224). If a donut does not exist (step 226), the server queries the user, receives a response to the query, and generates a donut for the user based upon the response, using exemplary database structure 220 (step 232). An example of a query is provided below. Otherwise, if a donut does exist for the user (step 226), the server queries the user in order to update the donut (step 228) and implements the updates to the donut, using exemplary database structure 200 (step 230). The queries may  
 15 involve the server transmitting a series of questions to the user and receiving from the user replies to the questions. The queries may also involve survey questions as described above. The server may require a response in order for the user to receive content from the network.

[0093] The server may optionally receive user-profile content for the user from another source. For example, a user profile may already exist for the user from another network-based system, and the server may receive that profile.  
 20 Upon optionally receiving the other user-profile content, such as a pre-existing user profile, the server selectively incorporates the content into the donut (step 234). The server may base the incorporation of the pre-existing other user-profile content on particular criteria such as the types of content required for the user profile and when the pre-existing user profile was updated. In addition, the server may incorporate all of the content or only selected portions of it.

[0094] The server assigns the user to a team based upon the user's donut and saves an indication of the assignment  
 25 in the user's donut (step 236). A team specifies a chat room for this user for a chat service; the donut information may be used with other network services as well. If the user already had a donut in the system, the server may use a pre-existing room assignment as a default assignment, or assign the user to a new team, particularly if the user's donut has been substantially updated. The server stores the user's donut in the database and optionally transmits a copy of the donut or particular portions of it for storage on the user's machine (step 238). The user's machine, if it receives the  
 30 donut, locally stores the donut or the updates to it.

[0095] After creating or updating a donut for the user, the server selects content for transmission to the user based upon the user-profile information stored in the user's donut (step 240). The selected content may be based upon particular criteria involving the user-profile information in the user's donut, and it may include a wide variety of types of information. The content may include networked content, meaning any type of information available via a Uniform  
 35 Resource Identifier (URI) (step 254). A URI is a compact string of characters for identifying an abstract or physical resource. More specifically, URIs provide a simple and extensible means for identifying a resource, and a URI can be further classified as a locator, a name, or both. The specification of URI syntax and semantics is derived from concepts introduced by the World Wide Web global information initiative. URIs include, for example, URLs and Uniform Resource Names (URNs). A URL is a subset of a URI which identifies resources via a representation of their primary access  
 40 mechanism, such as their network "location", rather than identifying the resource by name or other attribute of that resource. The term URN refers to a subset of URI that is required to remain globally unique and persistent even when the resource ceases to exist or becomes unavailable.

[0096] The selected content may also include video content (step 255); audio content (step 256); or any type of multimedia content (step 257). The multimedia content may include, for example, particular types of animations or  
 45 slide shows selected for transmission to the user's machine based upon the user's preferences or characteristics as identified in the user's donut. The video and audio content may include, for example, particular video and audio advertisements potentially of interest to the user and selected for transmission to the user's machine based upon the user's identified preferences. The video, audio, or multimedia content may include content related to a chat room discussion among the user and other members of the user's chat room or team. It may also include content related to  
 50 a program being viewed by the user. For example, if the user views a sports program, the content may include statistics or videos of past sports programs between the same teams or players, depending upon the user's identified preferences or interests as saved in the user's donut.

[0097] The selected content may also include a particular video stream, as identified above (step 258). In particular, several video streams captured from different camera angles may be available for a particular program. The server  
 55 may select a video stream for display to the user based upon the user's stated preferences. For example, a user may have stated a preference for watching the quarterback during a football game and, therefore, a video stream following the quarterback is selected for transmission to the user's machine. Another user may have expressed an interest in watching wide receivers, for example, and a video stream of the receivers is selected for transmission to that user's

machine. One method for providing multiple video streams is described, for example, in US patent No. 5861,881 and this method, or any other suitable method may be used to provide the multiple video streams.

[0098] The selected content may also include an executable object or application (step 259). For example, the server may transmit to the user a JAVA game or other types of electronic games based upon the user's preferences. The executable objects may also be used to dynamically push customized code to the user's machine while another application executes. In addition, selected executable objects may be used to facilitate electronic commerce transactions. In particular, identification of particular products available for purchase may be transmitted to the user based upon the user's preferences, and an executable object may be used to provide a common electronic "shopping cart" where the user is able to drag and drop identification of products to purchase among multiple vendors. The electronic shopping cart saves an identification of the products, and potentially other information, for use in transmitting and executing a purchase request for the products.

[0099] The selected content may include other types of content as well (step 260). Based upon the determination, the server pushes the particular content to the user's machine (242).

[0100] The server also monitors the user's activity in order to dynamically update the user's donut (step 244). The user's activity may involve any type of information relating to the user's interaction with the network or program content provided to the user. For example, the server may detect one or more of the following: the rate at which the user selects or "clicks on" URLs to request particular content; which URLs the user selects; the amount of elapsed time the user has remained logged onto the network; the extent to which the user participates in chat room discussions; and/or any other information which is detectible.

[0101] The server also determines whether to update the user's donut based upon the monitored user activity (step 246). This determination may be based upon particular criteria related to the user's activity. For example, the server may store particular types of activity or thresholds for activity and compare them to the user's monitored activity, providing for an update when the user's activity matches the particular types of activity or exceeds the thresholds. It may also be updated based upon survey questions. If the server has determined, based on the criteria, that the user's donut is to be updated (step 248), it dynamically updates the donut based on the user's activity, saves the updates, and optionally sends the updates to the user's machine (step 250). Otherwise, if the criteria have not been met, the server does not update the donut.

[0102] The server also detects whether the user has logged off the network (step 252). If the user remains logged onto the network, the server continues to select and push content to the user based upon the user's donut (steps 240, 242, 254-260), monitor the user's activity (step 244), and dynamically update the user's donut (steps 246, 248, and 250).

[0103] The following provides an example of the use of a donut. During a program, the server sends a user, Bob Smith, a question which states, "Do you own a Personal Digital Assistant (PDA)?" Bob returns a "Yes" answer. The corresponding crumb includes the meaning value pair PDA=True, which is then sent via the Internet to a distributed community network, as identified above. This crumb is captured from the distributed community network and stored in the database as a crumb in the sub-donut "Technology" under Bob Smith's donut. A copy of the crumb is stored locally in the client browser on Bob Smith's machine.

[0104] Later in the program, the host of the television program is reviewing the latest PDAs. The producer of the program wants to send web content specific to all the users on-line about PDAs. The producer pushes to all the users on-line a playlist item, as identified above, parameterized on whether a user has a PDA. Bob Smith's browser receives the playlist item, which references his donut. The browser recalls the value pair PDA=True, and from the logic in the playlist item, determines that Bob should see in his browser a web page which offers a discount on a PDA upgrade, rather than a web page which offers the user the opportunity to buy a new PDA for the first time.

[0105] In addition to this route of the crumb and the decision making occurring on the client side, the same process may occur solely on the server side.

[0106] Table 2 provides an Extensible Markup Language (XML) code listing for an exemplary donut. Table 3 provides an XML code listing for an exemplary collection of donuts. In Tables 2 and 3 the indentation represents the hierarchical structure of the donuts.

Table 2

---

```
5  <?xml version="1.0" encoding="UTF-8"?>
   <!DOCTYPE htvuser SYSTEM "donut.dtd" []>
10
   <htvuser name="Bart Simpson" uid="bart" pw="dude!">
     <donut desc="bart" id="bart">
15         <crumb desc="email" value="barf@fox.net" />
         <crumb desc="ccn" value="amex 5592 3800 0165 1872 exp 01" />
20         <donut desc="thebox">
           <crumb desc="style" value="rock" />
           <crumb desc="region" value="NE" />
           <crumb desc="fanof" value="Offspring, Limp Bizkit" />
25           <crumb desc="sex" value="yes" />
         </donut>
30       </donut>
     </htvuser>
35   <!--
     Client code can refer to:
       bart.ccn
       bart.thebox.region
40       bart.thebox.fanof
       etc.
45   -->
```

---

Table 3

```

5  <?xml version="1.0" encoding="UTF-8"?>
   <!DOCTYPE teamlist SYSTEM "donut.dtd" []>

10 <teamlist>

    <donut      desc="team"
15         id="hot-sax-mets"
         shared="true"
         members="lisa,sally,lukas">

20       <crumb desc="name"
         value="Hot Saxophonists Lusting after the Met's Shortstop" />
       <crumb desc="team-homepage"
         value="http://home.springfield.net/~lisa/mitt-lusters.html" />
25       <crumb desc="trivia-tries" value="22" />
       <crumb desc="trivia-correct" value="5" />
       <crumb desc="trivia-prizes" value="05" />
30     </donut>

    <htvuser name="Sally Brown" uid="sally" pw="beethoven">
35       <donut desc="sally" id="sally">
         <crumb desc="email" value="sally@shulz.net" />
         <crumb desc="ccn" value="mc 5592 3800 0165 1872 exp 012" />
40       <donut desc="espn" subs="hot-sax-mets">
         <crumb desc="sports" value="skiing" />
         <crumb desc="agegroup" value="2-5" />
45       </donut>
       </donut>
    </htvuser>

    <htvuser name="Lisa Simpson" uid="lisa" pw = "trane">
50       <donut desc="lisa" id="lisa">
         <crumb desc="email" value="lisa@fox.net" />
         <crumb desc="ccn" value="visa 5592 3800 0165 1872 exp 02" />
55       <donut desc="espn" subs="hot-sax-mets">

```



```

    <crumb desc="sports" value="curling.wwf" />
    <crumb desc="agegroup" value="5-10" />
5    <crumb desc="education" value="Springfield" />
    </donut>
    </donut>
10  </htvuser>
    <htvuser name="Lukas Doright" uid="duanne" pw="tomgirl">
    <donut desc="lukas" id="lukas">
15    <crumb desc="email" value="lukas@aol.com" />
    <crumb desc="ccn" value="amex 5592 3800 0165 1872 exp 00" />
    <donut desc="espn" subs="hot-sax-mets">
    <crumb desc="sports" value="baseball" />
20    <crumb desc="agegroup" value="18-24" />
    </donut>
    </donut>
25  </htvuser>

</teamlist>
30

```

---

[0107] It will be appreciated that modifications and variations may be made to the embodiments of the invention described and illustrated within the scope of the accompanying claims.

#### Claims

1. A device for compiling and maintaining information for use in routing and transmitting content to a machine via a network, comprising:
  - a computer-readable medium including information for use in transmitting content to a machine; said medium comprising fields for specifying an identification of the machine, an address of the machine, and user-profile information, for use in determining a type of content to transmit to the machine, the user-profile information being specified in an hierarchical attribute value pair data structure.
2. A device as claimed in Claim 1, wherein the computer-readable medium further specifies attributes of a user associated with the user-profile information and the hierarchical structure identifies hierarchical relationships among the attributes.
3. A device as claimed in Claim 1 or Claim 2, wherein the medium specifies information identifying the user.
4. A device as claimed in any of Claims 1 to 3, wherein the medium specifies information identifying preferences of a user.
5. A device as claimed in Claim 5, wherein the medium specifies information identifying a room assigned to a user for a chat service.

6. A device as claimed in Claim 5, wherein the medium specifies information identifying members of the room for the chat service.
- 5 7. A device as claimed in any preceding claim, wherein the computer-readable medium further specifies an indication of a directory for use in obtaining instructions for routing the content.
8. A device as claimed in any preceding claim, wherein the medium includes user-profile information for use in selecting at least one of the following to transmit to the machine: information available via a Uniform Resource Identifier, video content, audio content, multimedia content, a particular video stream, or an executable object.
- 10 9. A device as claimed in any preceding claim, wherein the medium includes user-profile information for use in selectively transmitting survey questions to the user.
- 15 10. A device as claimed in Claim 9, wherein the computer-readable medium further comprises information identifying preferences of a user based on responses by the user to the survey questions.
11. A device as claimed in any preceding claim, wherein the medium specifies the address of one or more of a personal computer, a television, a cable box, a satellite box, a video game console, and/or of a personal digital assistant.
- 20 12. A device as claimed in any preceding claim, wherein the medium comprises information identifying a hobby of a user.
13. A device as claimed in any preceding claim, wherein the medium comprises information identifying spending habits of a user.
- 25 14. A device as claimed in any preceding claim, wherein the medium comprises information identifying viewing habits of a user.
15. A device as claimed in any preceding claim, wherein the medium comprises information identifying the demographics of a user.
- 30 16. A device as claimed in any preceding claim, wherein the medium comprises information identifying information concerning a Universal Resource Locator viewed by a user.
- 35 17. A device as claimed in any preceding claim, wherein the medium comprises at least one of the following types of content to transmit to the machine: advertising content, sport content, music content, audio content, program suggestions, entertainment content, live content, pre-recorded content, non-commercial content, news content, game show content, and educational content.
- 40 18. A device as claimed in any preceding claim, wherein the content is transmitted to a machine via at least one hub of a distributed community network.
19. A device as claimed in any preceding claim, wherein the at least one hub of a distributed computer network transmits content utilising at least one of the following: the Internet, an intranet, radio frequency broadcast, wireless connection, satellite broadcast, cable, telephone circuit, fibre optics, a public network, and a private network.
- 45 20. A device as claimed in any preceding claim, wherein the content transmitted to the machine comprises at least one of the following: an advertisement, a motion picture program, a live program, an audio program, a music video program, a pre-recorded program, a sports program, a non-commercial program, a game show program, and a news program.
- 50 21. A method for compiling and maintaining information for use in routing and transmitting content to a machine via a network by specifying particular fields within a computer-readable medium, the method comprising the steps of:  
55 receiving information for use in generating a user profile;  
specifying in the medium, using the information, an identification of a machine, an address of the machine, and user-profile information for use in determining a type of content to transmit to the machine; and  
storing the user-profile information in an hierarchical attribute value pair data structure.

22. A method as claimed in Claim 21, further comprising the steps of:

specifying in the medium attributes of a user associated with the user-profile information; and  
specifying in the hierarchical structure hierarchical relationships among the attributes.

23. A method as claimed in Claim 21 or Claim 22, further comprising specifying in the medium information identifying the user.

24. A method as claimed in any of Claims 21 to 23, further comprising specifying in the medium information identifying preferences of the user.

25. A method as claimed in any of Claims 21 to 24, further comprising specifying in the medium information identifying a room assigned to a user for a chat service.

26. A method as claimed in Claim 25, further comprising specifying in the medium information identifying members of the room for the chat service.

27. A method as claimed in any of Claims 21 to 26, further comprising specifying in the medium an indication of a directory for use in obtaining instructions for routing the content.

28. A method as claimed in any of Claims 21 to 27, further comprising dynamically changing the user-profile information in the hierarchical structure based upon updated information.

29. A method as claimed in any of Claims 21 to 28, further comprising querying the user in order to obtain user-profile information.

30. A method as claimed in any of Claims 21 to 29, further comprising transmitting content to the machine for a particular service based upon user-profile information.

31. A method as claimed in any of Claims 21 to 30, further comprising dynamically updating the user-profile information.

32. A method as claimed in Claim 31, wherein the dynamically updating step comprises:

monitoring activity of a user associated with the user-profile information; and  
updating the user-profile information based upon the monitored activity.

33. A method as claimed in Claim 32, wherein the monitored activity is at least one of: the rate of clicking of a user, the Universal Resource Locators selected by a user, the time on the network for a user, and the time a user spent in a chat room.

34. A method as claimed in any of Claims 31 to 33, wherein the dynamically updating step comprises:

selectively transmitting survey questions to a user;  
receiving responses to the survey questions from the user; and  
updating the user-profile information based on the responses received.

35. A method as claimed in any of Claims 21 to 34, further comprising specifying the user-profile information for use in selecting at least one of the following to transmit to the machine: information available via a Uniform Resource Identifier, video content, audio content, multimedia content, a particular video stream, or an executable object.

36. A method as claimed in Claim 35, wherein the executable object is at least one of: a game, a program for use in an electronic commerce transaction, and an electronic shopping cart for use in an electronic commerce transaction.

37. A method as claimed in any of Claims 21 to 36, further comprising specifying the user-profile information for use in selectively transmitting survey questions to a user.

38. A method as claimed in any of Claims 21 to 37, further comprising specifying the address of one or more of a personal computer, a television, a cable box, a satellite box, video game console, and/or of a personal digital

assistant.

39. A method as claimed in any of Claims 21 to 38, further comprising specifying a hobby of a user.

40. A method as claimed in any of Claims 21 to 39, further comprising specifying the spending habits of a user.

41. A method as claimed in any of Claims 21 to 40, further comprising specifying the viewing habits of a user.

42. A method as claimed in any of Claims 21 to 41, further comprising specifying demographic information about a user.

43. A method as claimed in any of Claims 21 to 42, further comprising specifying information concerning a Universal Resource Locator viewed by the user.

44. A method as claimed in any of Claims 21 to 43, further comprising specifying the user-profile information for use in selecting at least one of the following to transmit to the machine: advertising content, sport content, music content, audio content, program suggestions, icons representing particular services, entertainment content, and education content.

45. A method as claimed in any of Claims 21 to 44, wherein the content is transmitted to the machine via at least one hub of a distributed community network.

46. A method as claimed in Claim 45, wherein the at least one hub of a distributed computer network transmits content utilising at least one of: the Internet, an intranet, radio frequency broadcast, wireless connection, satellite broadcast, cable, telephone circuit, fibre optics, a public network, and a private network.

47. A method as claimed in Claim 45 or Claim 46, wherein the content comprises at least one of: an advertisement, a game show program, a motion picture program, a live program, an audio program, a music video program, a pre-recorded program, a sports program, and a news program.

48. A method as claimed in any of Claims 21 to 47, further comprising transmitting a programming signal and at least one address identifying online content related to the program, the content being provided by an online information source connected via the network to the machine.

49. A method as claimed in Claim 48, wherein the content of the programming signal is based upon the user-profile information.

50. A method as claimed in Claim 48 or Claim 49, wherein the programming signal is transmitted via at least one of: the Internet, an intranet, terrestrial broadcast, radio frequency broadcast, cable, satellite broadcast, fibre optics, a telephone circuit, a wireless connection, a public network, and a private network.

51. A method as claimed in any of Claims 48 to 50, wherein the address is a uniform resource locator, the uniform resource locator identifying the online information source which is an Internet site.

52. A method as claimed in any of Claims 48 to 51, wherein the online information source is at least one of: an intranet, the Internet, a public network, and a private network.

53. A method as claimed in any of Claims 48 to 52, wherein the at least one address identifying online content is based on the user-profile information.

54. A method as claimed in any of Claims 48 to 53, wherein the content comprises at least one of: text, graphics, video, data, audio, animation, video stills, slow frame video, multimedia, and a sequence of individual frames.

55. A method as claimed in any of Claims 48 to 54, wherein the content is arranged to be presented automatically at a user device concurrently with or in conjunction with the program, and wherein the content is related to the program.

56. A method as claimed in Claim 55, further comprising transmitting at least one address identifying online content wherein the online content relates to a program, wherein the user is automatically presented the online content at predetermined times during the program.

57. A method as claimed in Claim 56, wherein the address is transmitted to the user independently of the program.

58. A method as claimed in Claim 56, wherein the address is transmitted to the user prior to the initiation of the program.

5 59. A method as claimed in Claim 56, wherein the address is transmitted to the user during the program.

60. A method as claimed in any of Claims 48 to 59, wherein the online content is transmitted via at least one of: the Internet, an intranet, terrestrial broadcast, radio frequency broadcast, cable, satellite broadcast, fibre optics, a telephone circuit, a wireless connection, a public network, and a private network.

10 61. A method as claimed in any of Claims 21 to 47, further comprising transmitting a programming signal to a first receiver, and at least one address, identifying online content related to the program provided by an online information source, to a second receiver.

15 62. A method as claimed in Claim 61, further comprising the steps of:

establishing a communications link between the second receiver and the online information source identified by the address; and  
receiving an online information segment associated with the programming signal.

20 63. A method as claimed in Claim 61 or Claim 62, wherein the programming signal is transmitted via at least one of: the Internet, an intranet, terrestrial broadcast, radio frequency broadcast, cable, satellite broadcast, fibre optics, a telephone circuit, a wireless connection, a public network, and a private network.

25 64. A method as claimed in any of Claims 61 to 63, wherein the programming signal comprises at least one of: text, data, graphics, video, audio, animation, video stills, slow frame video, multimedia, and a sequence of individual frames.

30 65. A method of accessing information for use in routing and transmitting content to a machine via a network, the method comprising the steps of:

establishing a network connection from a machine;  
accessing via the network connection an hierarchical attribute value pair data structure stored in a computer-readable medium; and  
35 transmitting information via the network connection for specifying in the data structure an identification of the machine, an address of the machine, and user-profile information for use in determining a type of content to transmit to the machine.

40 66. A method as claimed in Claim 65, further comprising storing the data structure in a memory associated with the machine.

67. A method as claimed in Claim 65 or Claim 66, further comprising storing the data structure in a memory associated with a server having the network connection with the machine.

45 68. A method as claimed in any of Claims 65 to 67, further comprising dynamically updating the user-profile information.

69. A method as claimed in Claim 68, wherein the dynamically updating step comprises:

50 selectively transmitting survey questions to a user;  
receiving responses to the survey questions from the user; and  
updating the user-profile information based on the responses received.

70. A method as claimed in Claim 68 or Claim 69, wherein the dynamically updating step comprises:

55 monitoring activity of a user associated with the user-profile information; and  
updating the user-profile information based upon the monitored activity.

71. A method as claimed in Claim 70, wherein the monitored activity is selected from: a rate of clicking of a user, a

Universal Resource Locator selected by a user, a time on the network for a user, and a time a user spent in a chat room.

- 5 72. A method as claimed in any of Claims 65 to 71, further comprising selecting, based upon the user-profile information, at least one of the following for transmission to the machine: information available via a Uniform Resource Identifier, video content, audio content, multimedia content, a particular video stream, or an executable object.
73. A method as claimed in Claim 72, wherein the executable object is at least one of: a game, a program for use in an electronic commerce transaction, and an electronic shopping cart for use in an electronic commerce transaction.
- 10 74. A method as claimed in any of Claims 65 to 73, further comprising selecting, based on the user-profile information, at least one of the following for transmission to the machine: advertising content, sport content, music content, audio content, program suggestions, icons representing particular services, entertainment content, and education content.
- 15 75. Apparatus for compiling and maintaining information for use in routing and transmitting content to a machine via a network, the apparatus comprising:
  - means for receiving information for use in generating a user profile;
  - 20 means for specifying, based on the information received, a machine, an address associated with the machine, and user-profile information for use in determining a type of content to transmit to the machine; and
  - means for storing the user-profile information in a hierarchical attribute value pair data structure.
- 25 76. Apparatus as claimed in Claim 75, further comprising:
  - means for specifying attributes of a user associated with the user-profile information; and
  - means for specifying in a hierarchical structure, hierarchical relationships among at least two hierarchical attributes.
- 30 77. Apparatus as claimed in Claim 75 or Claim 76, further comprising means for specifying information which identifies the user.
78. Apparatus as claimed in any of Claims 75 to 77, further comprising means for specifying information identifying at least one preference of the user.
- 35 79. Apparatus as claimed in any of Claims 75 to 78, further comprising means for specifying information identifying a room to which a user is assigned for a chat service.
80. Apparatus as claimed in Claim 79, further comprising means for specifying information identifying members of the room for the chat service.
- 40 81. Apparatus as claimed in any of Claims 75 to 80, further comprising means for specifying an indication of a directory for providing instructions for routing the content.
- 45 82. Apparatus as claimed in any of Claims 75 to 81, further comprising means for dynamically changing the user-profile information in the hierarchical structure based upon updated information.
83. Apparatus as claimed in any of Claims 75 to 82, further comprising means for querying a user in order to obtain the user-profile information.
- 50 84. Apparatus as claimed in any of Claims 75 to 83, further comprising means for transmitting content to the machine for a particular service based upon the user-profile information.
85. Apparatus as claimed in any of Claims 75 to 84, further comprising means for dynamically updating the user-profile information.
- 55 86. Apparatus as claimed in Claim 85, further comprising:

means for monitoring activity of a user associated with the user-profile information; and  
means for updating the user-profile information based upon the monitored activity.

87. Apparatus as claimed in Claim 86, where in the monitored activity is at least one of: a rate of clicking by a user, a  
5 Universal Resource Locator selected by a user, a network time for a user, and a time spent by a user in a chat room.

88. Apparatus as claimed in any of Claims 75 to 87, further comprising means for selecting to transmit to the machine  
at least one of the following types of information: information available via a Uniform Resource Identifier, video  
10 content, audio content, multimedia content, a particular video stream and an executable object.

89. Apparatus as claimed in Claim 88, wherein the executable object is at least one of: a game, a program for use in  
an electronic commerce transaction, and an electronic shopping cart for use in an electronic commerce transaction.

90. Apparatus as claimed in any of Claims 75 to 89, further comprising means for specifying the user-profile information  
15 for use in selectively transmitting survey questions to a user.

91. Apparatus as claimed in any of Claims 75 to 90, wherein the address specified is of at least one device selected  
from a personal computer, a television, a cable box, a satellite box, video game console, a personal digital assistant,  
20 or a hand-held computer.

92. Apparatus as claimed in any of Claims 75 to 91, further comprising means for specifying a hobby of a user.

93. Apparatus as claimed in any of Claims 75 to 92, further comprising means for specifying a spending habit of a user.

94. Apparatus as claimed in any of Claims 75 to 93, further comprising means for specifying a viewing habit of a user.  
25

95. Apparatus as claimed in any of Claims 75 to 94, further comprising means for specifying demographic information  
about a user.

96. Apparatus as claimed in any of Claims 75 to 95, further comprising means for specifying information concerning  
30 a Universal Resource Locator viewed by a user.

97. Apparatus as claimed in any of Claims 75 to 96, further comprising means for utilising the user profile information  
to transmit to the machine at least one of the following type of content: advertising content, sport content, music  
35 content, audio content, program suggestions, icons representing particular services, entertainment content, and  
education content.

98. Apparatus as claimed in any of Claims 75 to 97, further comprising:

40 means for selectively transmitting survey questions to the user;  
means for receiving responses to the survey questions from the user; and  
means for updating the user-profile information based on the responses received.

99. A computer-readable medium containing programming instructions for controlling a computer system which routes  
45 and transmits content to a machine via a network, by:

receiving information for use in generating a user profile;  
specifying, using the information, an identification of a machine, an address of the machine, and user-profile  
50 information for use in determining a type of content to transmit to the machine; and  
storing the user-profile information in an hierarchical attribute value pair data structure.

100. A computer-readable medium as claimed in Claim 99, wherein the instructions further include:

55 specifying attributes of a user associated with the user-profile information; and  
specifying relationships among the attributes in a hierarchical structure.

101. A computer-readable medium as claimed in Claim 99 or Claim 100, wherein the instruction of specifying attributes  
of a user associated with the user-profile information further comprises specifying additional information identifying

the user.

102.A computer-readable medium as claimed in any of Claims 99 to 101, wherein the instruction of specifying attributes of a user associated with the user-profile information further comprises specifying information identifying preferences of the user.

103.A computer-readable medium as claimed in any of Claims 99 to 102, wherein the instruction of specifying attributes of a user associated with the user-profile information further comprises specifying information identifying a room to which the user is assigned for a chat service.

104.A computer-readable medium as claimed in any of Claims 99 to 103, wherein the instruction of specifying attributes of a user associated with the user-profile information further comprises specifying information which identifies members of the room for a chat service.

105.A computer-readable medium as claimed in any of Claims 99 to 104, wherein the instruction of specifying attributes of a user associated with the user-profile information further comprises specifying an indication of a directory for use in providing instructions for routing the content.

106.A computer-readable medium as claimed in any of Claims 99 to 105, wherein the instructions further comprise dynamically changing the user-profile information in the hierarchical structure based upon updated information.

107.A computer-readable medium as claimed in any of Claims 99 to 106, wherein the instructions further comprise querying the user in order to obtain the user-profile information.

108.A computer-readable medium as claimed in any of Claims 99 to 107, wherein the instructions further comprise transmitting content to the machine for a particular service based upon the user-profile information.

109.A computer-readable medium as claimed in any of Claims 99 to 108, wherein the instructions further comprise dynamically updating the user-profile information.

110.A computer-readable medium as claimed in Claim 109, wherein the instruction of dynamically updating the user-profile information further comprises:

monitoring activity of a user associated with the user-profile information; and  
updating the user-profile information based upon the monitored activity.

111.A computer-readable medium as claimed in Claim 110, wherein the monitored activity is at least one of: a rate of clicking by the user, a Universal Resource Locator selected by the user, a time on the network for the user, and a time spent in a chat room by the user.

112.A computer-readable medium as claimed in any of Claims 99 to 111, wherein the specifying instruction further utilises the user-profile information to transmit to a machine at least one of: Uniform Resource Identifier, video content, audio content, multimedia content, a particular video stream, and an executable object.

113.A computer-readable medium as claimed in Claim 112, wherein the executable object is at least one of: a game, a program for use in an electronic commerce transaction, and an electronic shopping cart for use in an electronic commerce transaction.

114.A computer-readable medium as claimed in any of Claims 99 to 113, wherein the specifying instruction further comprises specifying the user-profile information to selectively transmit survey questions to the user.

115.A computer-readable medium as claimed in any of Claims 99 to 114, wherein the specifying instruction further comprises specifying the address of at least one of the following devices: a personal computer, a television, a cable box, a satellite box, video game console, hand-held computer, and a personal digital assistant.

116.A computer-readable medium as claimed in any of Claims 99 to 115, wherein the specifying step further comprises specifying a hobby of a user.



117. A computer-readable medium as claimed in any of Claims 99 to 116, wherein the specifying step further comprises specifying a spending habit of a user.

118. A computer-readable medium as claimed in any of Claims 99 to 117, wherein the specifying step further comprises specifying a viewing habit of a user.

119. A computer-readable medium as claimed in any of Claims 99 to 118, wherein the specifying step further comprises specifying demographic information of a user.

120. A computer-readable medium as claimed in any of Claims 99 to 119, wherein the specifying step further comprises specifying information concerning a Universal Resource Locator viewed by a user.

121. A computer-readable medium as claimed in any of Claims 99 to 120, wherein the specifying step further comprises utilising the user profile information to select the content to transmit to the machine, at least one type of content being selected from: advertising content, sport content, music content, audio content, program suggestions, icons representing particular services, entertainment content, and education content.

122. A computer-readable medium as claimed in Claim 106, wherein the step of dynamically changing the user-profile information comprises:

selectively transmitting survey questions to the user;  
receiving responses to the survey questions from the user; and  
updating the user-profile information based on the responses received.

123. A computer-readable medium containing programming instructions which controls a computer system, the computer system being used to route and transmit content to a machine via a network, by:

establishing a network connection to a machine;  
accessing via the network, a hierarchical attribute value pair data structure; and  
transmitting information, via the network connection, which specifies an identification of the machine in the data structure, an address of the machine, and user-profile information for use in determining a type of content to transmit to the machine.

124. A computer-readable medium as claimed in Claim 123, wherein the instructions further comprise storing the data structure in a memory associated with the machine.

125. A computer-readable medium as claimed in Claim 123 or Claim 124, wherein the instructions further comprise storing the data structure in a memory associated with a server connected via the network to the machine.

126. A computer-readable medium as claimed in any of Claims 123 to 125, wherein the instructions further comprise dynamically updating the user-profile information.

127. A computer-readable medium as claimed in Claim 126, wherein the instruction of dynamically updating the user-profile information comprises:

monitoring activity of a user associated with the user-profile information; and  
updating the user-profile information based upon the monitored activity.

128. A computer-readable medium as claimed in any of Claims 123 to 127, wherein the instructions further comprise selecting, based upon the user-profile information for transmission to the machine, wherein the information is selected from the group consisting of: information available via a Uniform Resource Identifier, video content, audio content, multimedia content, a particular video stream, or an executable object.

129. Apparatus for accessing information for use in routing and transmitting content to a machine via a network, comprising:

means for establishing a network connection to a machine;  
means for accessing, via the network connection, a hierarchical attribute value pair data structure stored in a

computer-readable medium; and  
means for transmitting information, via the network, specified in the data structure, an address of the machine,  
and user-profile information; wherein the user profile is used to determine a type of content to transmit to the  
machine.

5 130. Apparatus as claimed in Claim 129, wherein the apparatus further comprises means for storing the data structure  
in a memory associated with the machine.

10 131. Apparatus as claimed in Claim 129 or Claim 130, wherein the apparatus further comprises means for storing the  
data structure in a memory associated with a server connected, via the network, to the machine.

132. Apparatus as claimed in any of Claims 129 to 131, further comprising means for dynamically updating the user-  
profile information.

15 133. Apparatus as claimed in Claim 132, wherein the means for dynamically updating the user-profile information further  
comprises:

means for monitoring activity by a user associated with the user-profile information; and  
means for updating the user-profile information based upon the monitored activity.

20 134. Apparatus as claimed in any of Claims 129 to 133, further comprising means for selecting, based upon the user-  
profile information, at least one of the following types of content: advertising content, sport content, music content,  
audio content, program suggestions, icons representing particular services, entertainment content, and education  
content; wherein the content is transmitted to the machine.

25 135. A method of receiving customised information at a user machine via a network, comprising:

establishing a network connection;  
receiving content information via the network connection, wherein the content is dependent on an identification  
of a machine, an address for the machine, and user-profile information.

30 136. A method as claimed in Claim 135, wherein the content information is at least one selected from the group con-  
sisting of the following: information available via a Uniform Resource Identifier, video content, audio content, mul-  
timedia content, a particular video stream, and an executable object.

35 137. A method for determining summary information by managing a plurality of user profiles, comprising the steps of:

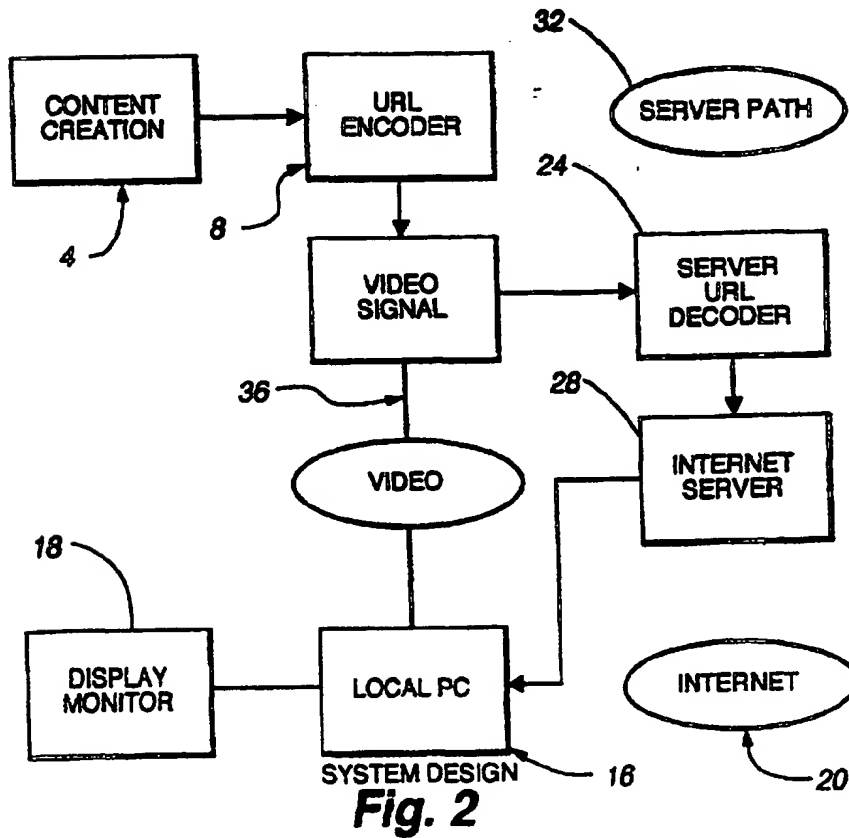
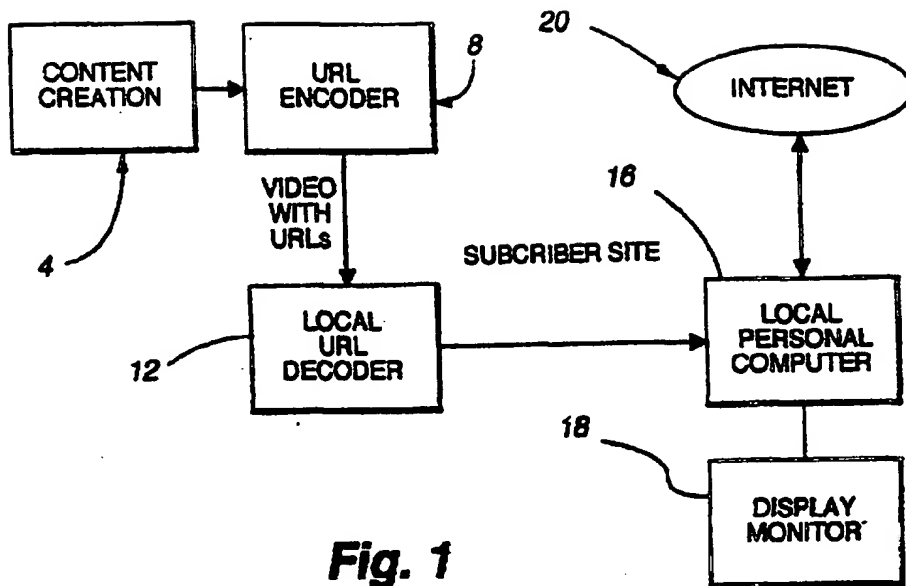
receiving a plurality of user profiles;  
processing the plurality of user profiles; and  
determining summary information based on the processing of the user profiles.

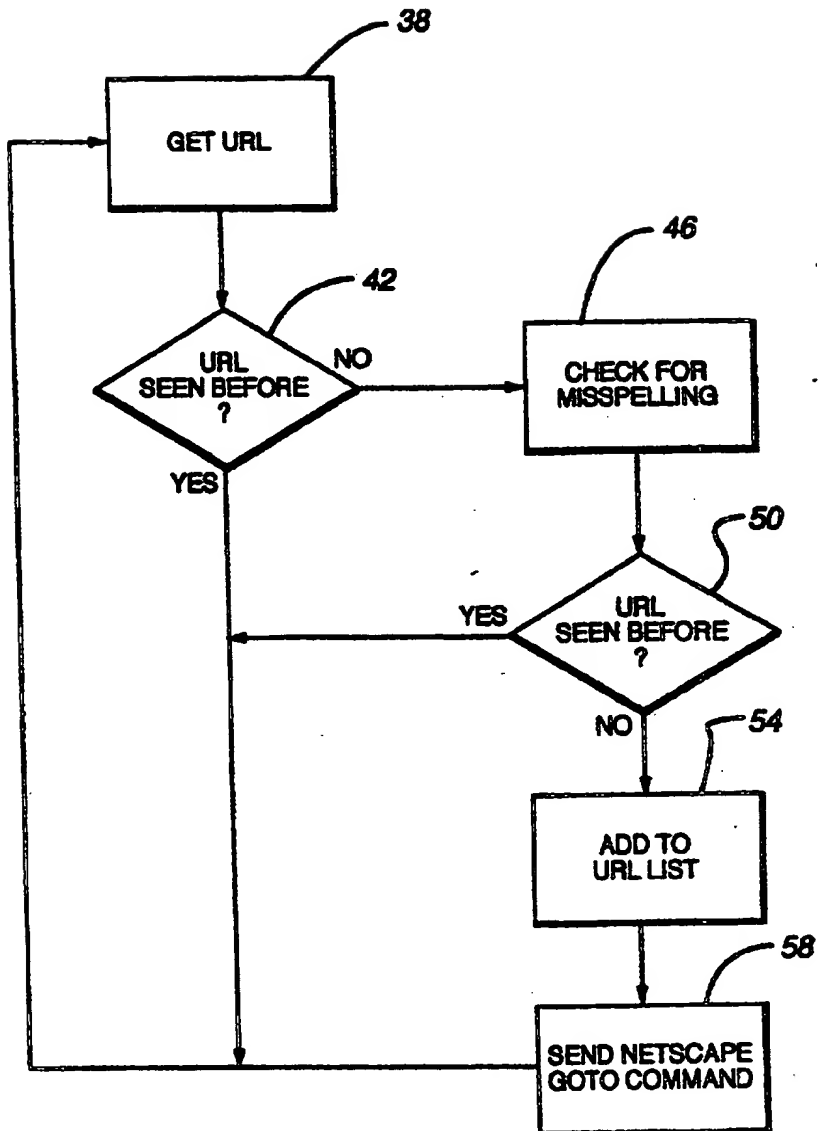
40 138. A method as claimed in Claim 137, further comprising the step of creating a group profile.

45 139. A method as claimed in Claim 137 or Claim 138, wherein the summary information is based on at least one of:  
viewing patterns, clicking patterns, demographic information, purchase patterns, listening patterns, the time users  
spend in chat rooms, hobbies of the users, geographic location, demographic information, responses to survey  
questions, and the type of machine utilised by a user.

50 140. A method as claimed in any of Claims 137 to 139, further comprising the step of transmitting content to at least  
one user machine based on a group profile.

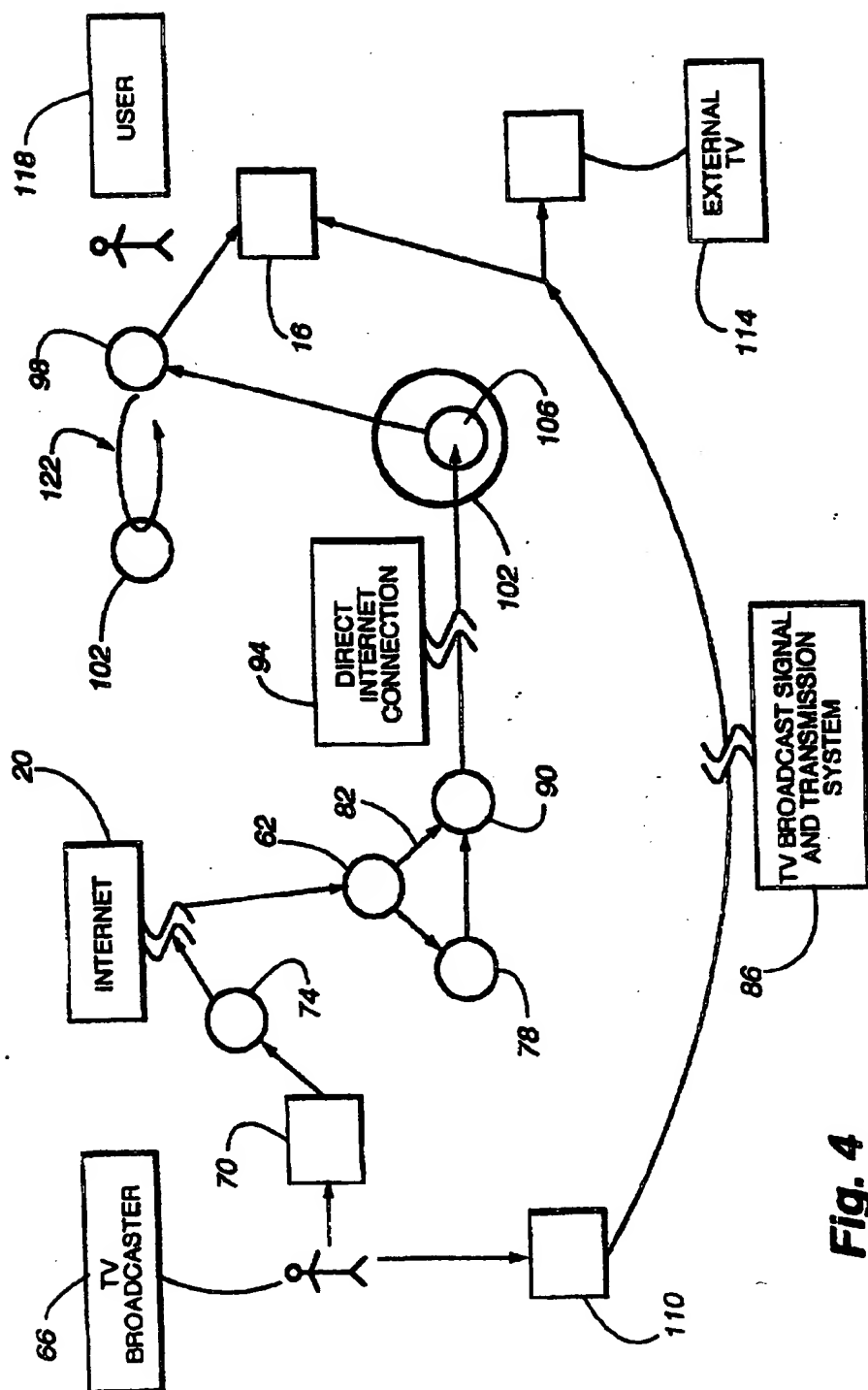
55 141. A method as claimed in Claim 140, wherein the content comprises at least one of: an advertisement, a game show  
program, a motion picture program, a live program, an audio program, a music video program, a pre-recorded  
program, a sports program, a non-commercial program, and a news program.



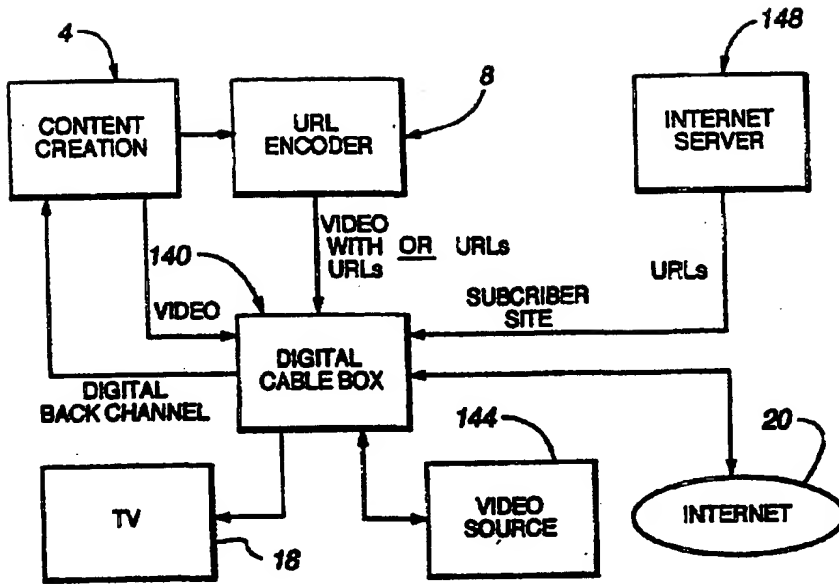


SOFTWARE DESIGN

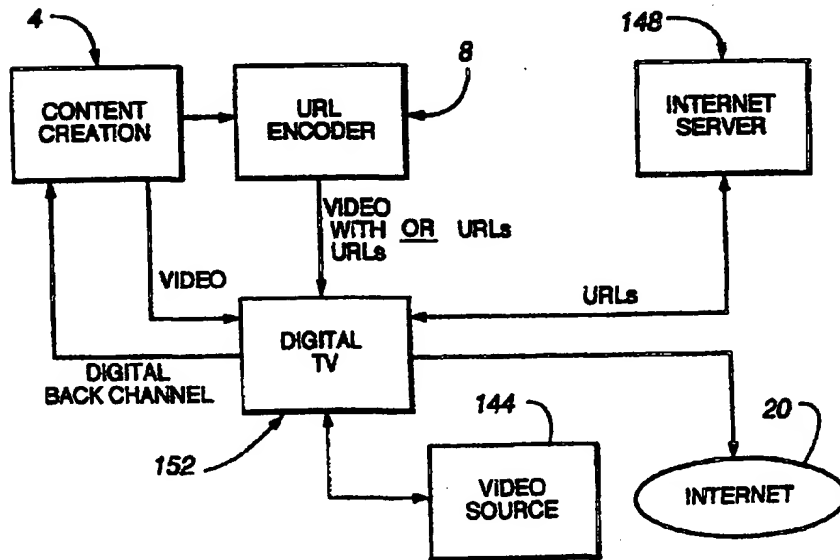
**Fig. 3**



**Fig. 4**



**Fig. 5**



**Fig. 6**

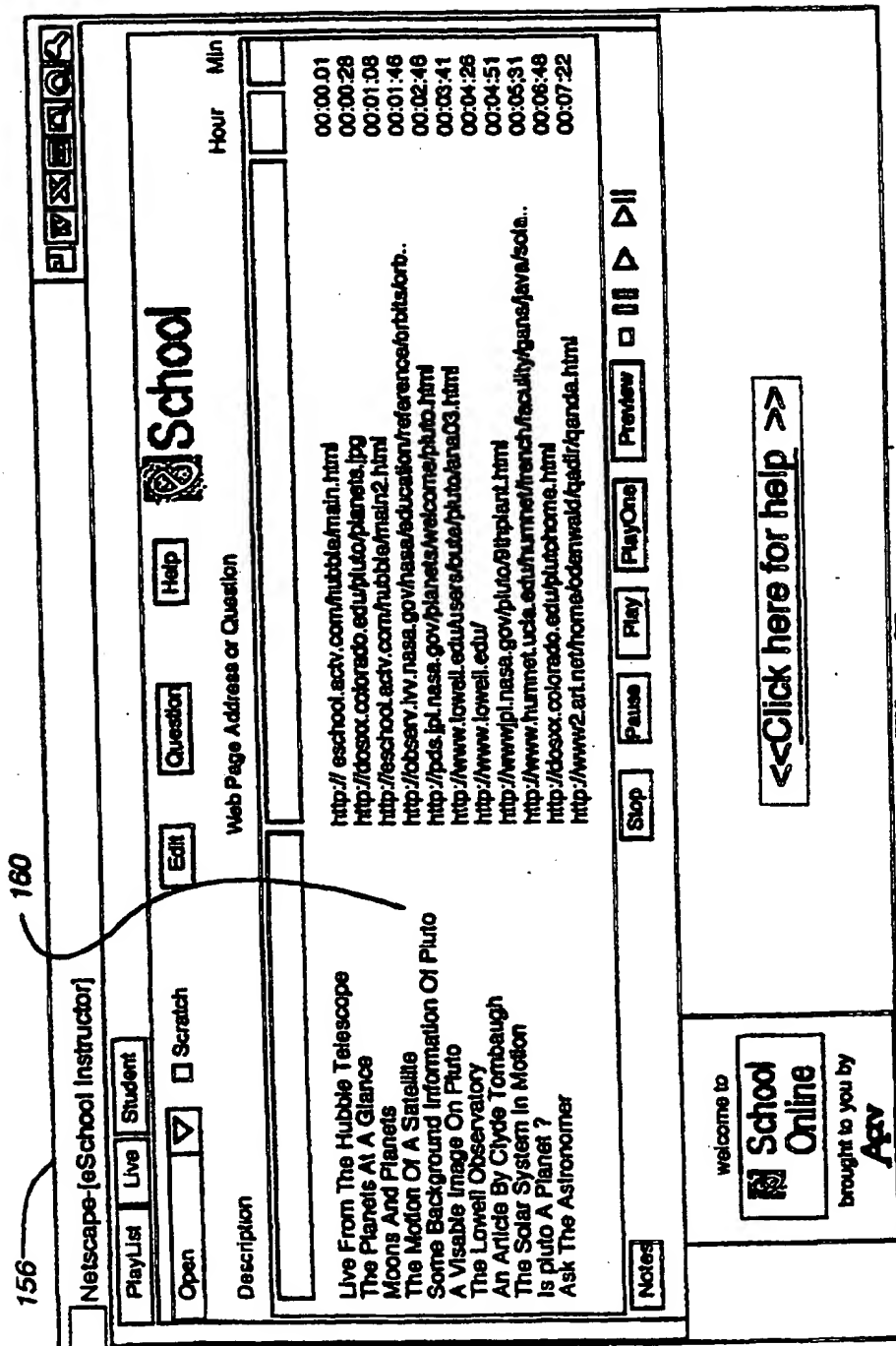
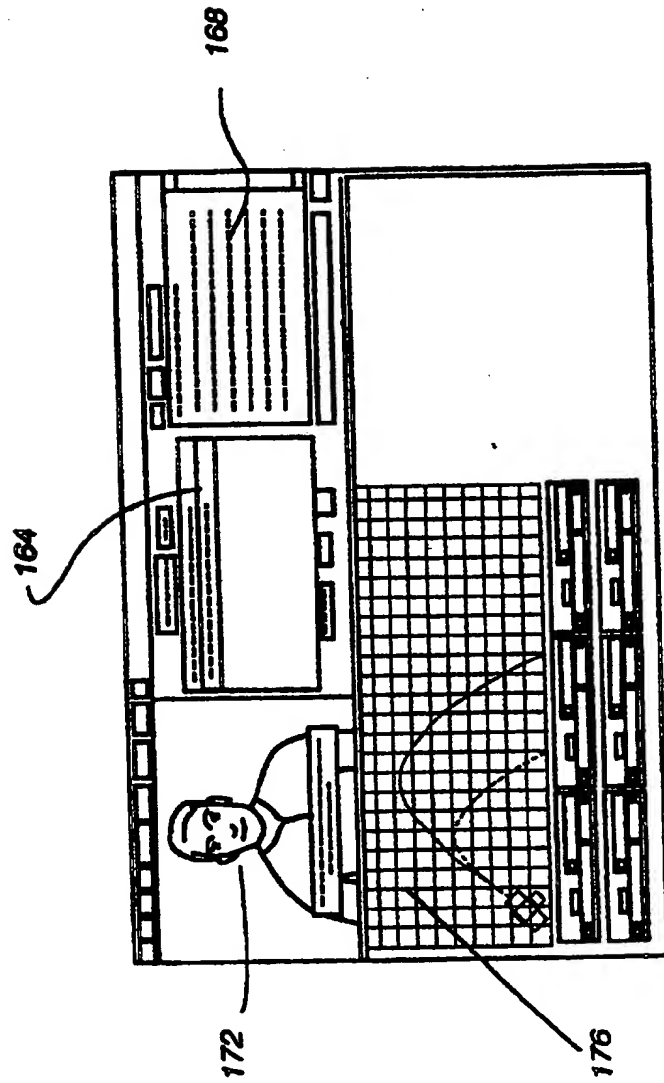
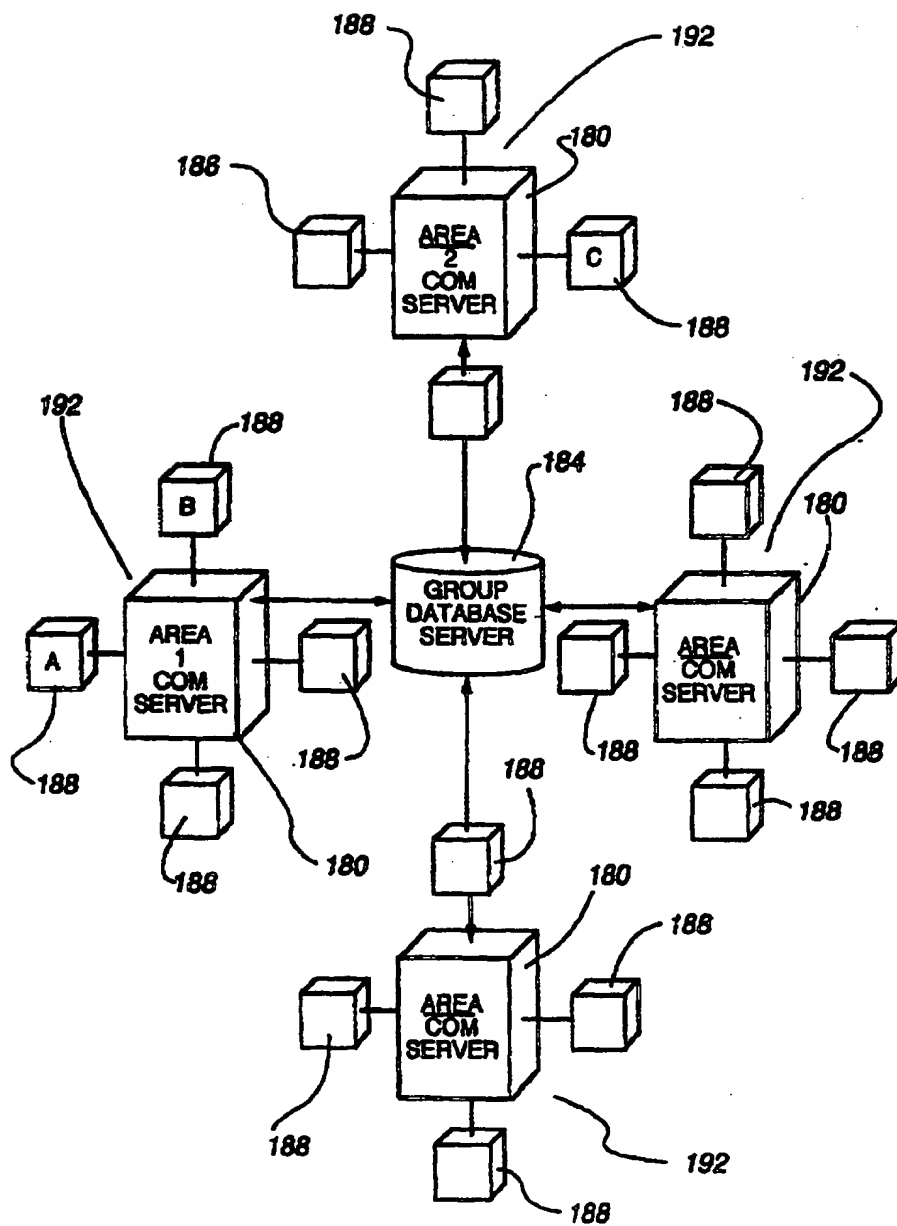


Fig. 7



**Fig. 8**





**Fig. 9**

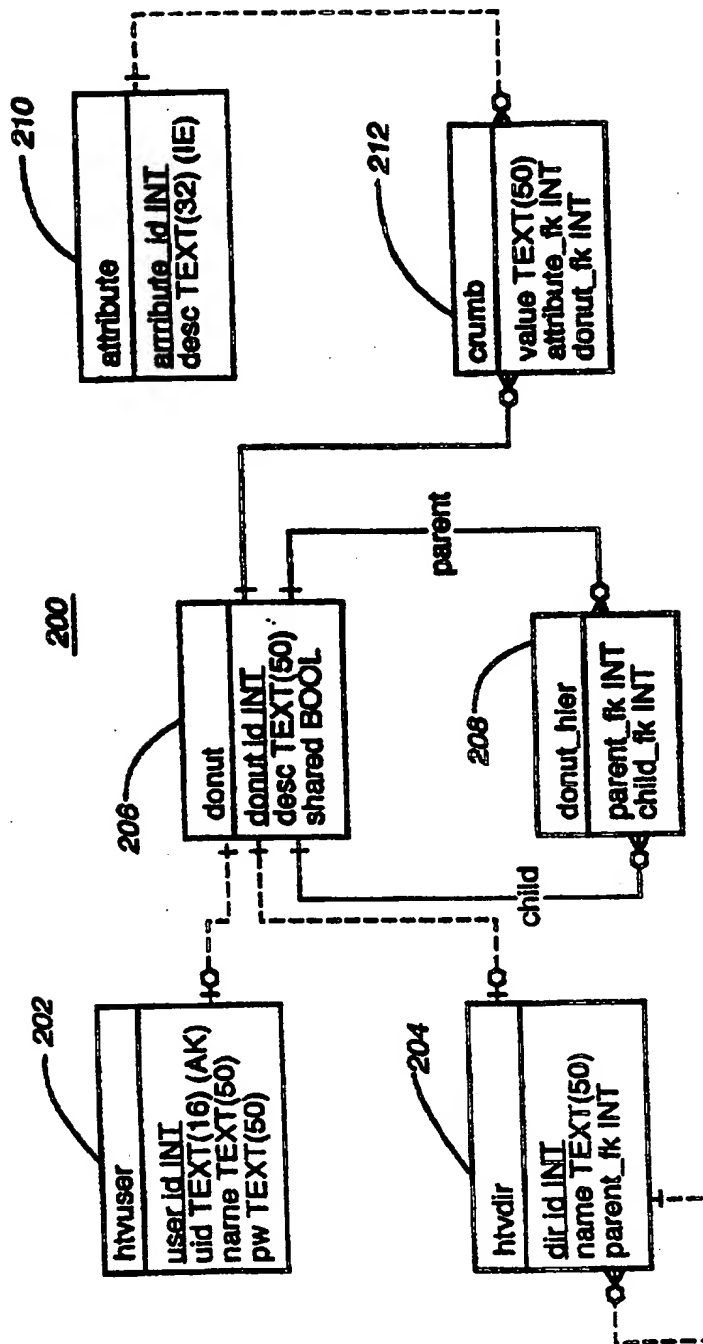


Fig. 10

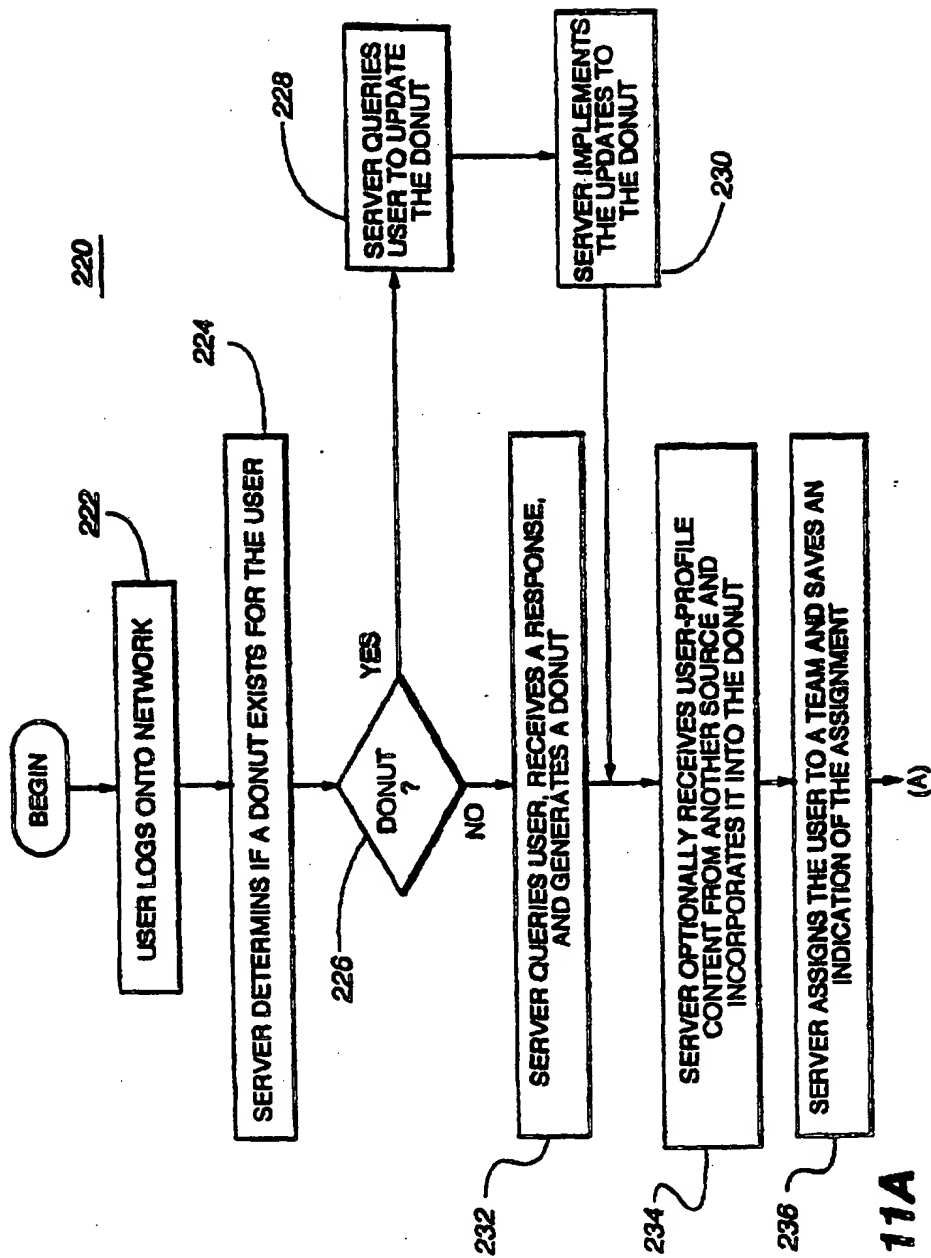


Fig. 11A

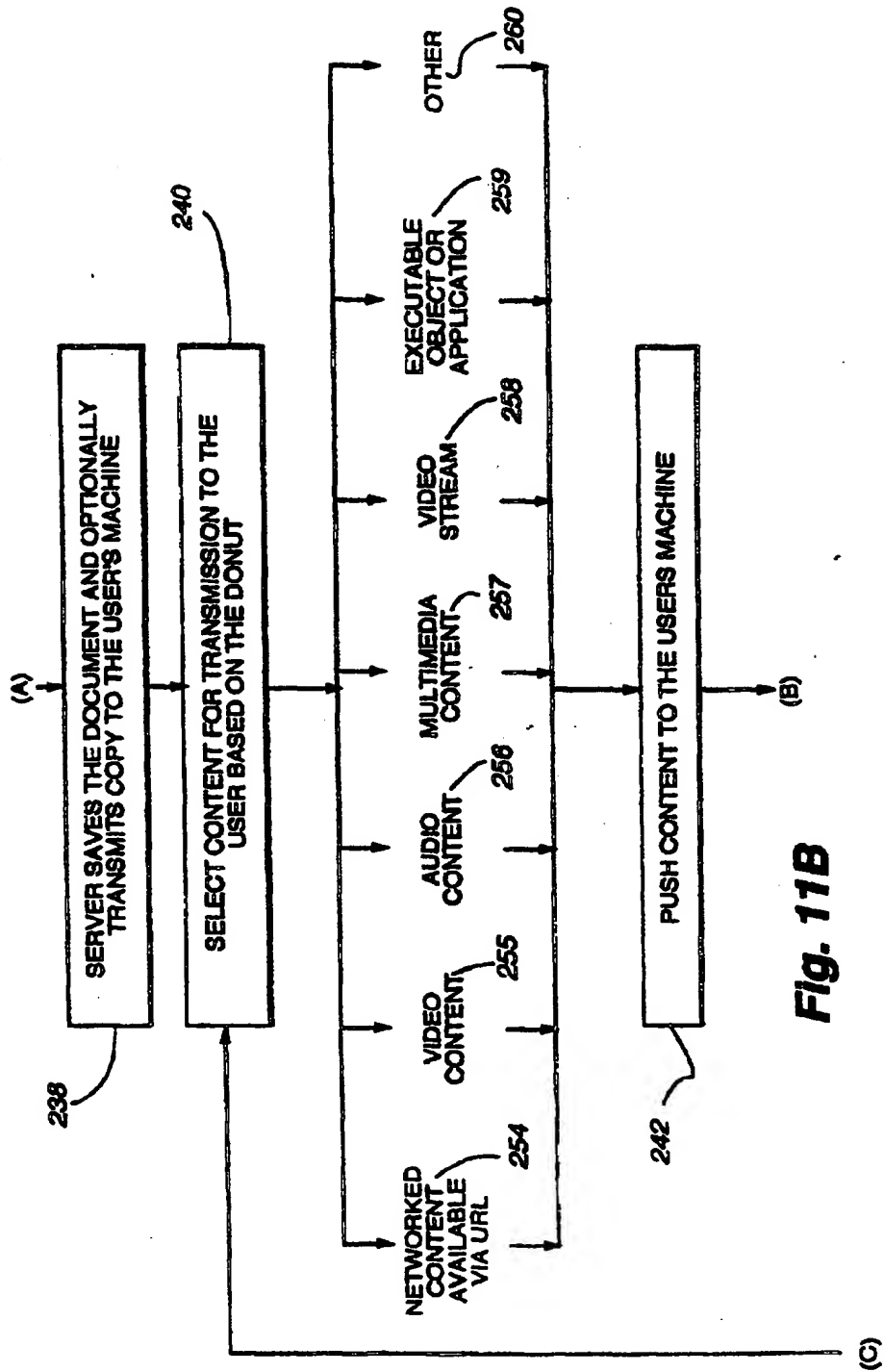


Fig. 11B



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## EUROPEAN SEARCH REPORT

Application Number  
EP 00 30 8630

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The present search report has been drawn up for all claims			
Place of search <b>MUNICH</b>		Date of completion of the search <b>1 December 2000</b>	Examiner <b>Schoeyer, M</b>
CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document		T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons  &: member of the same patent family, corresponding document	

EPO FORM 1603 03.92 (P04C01)



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Office

## EUROPEAN SEARCH REPORT

Application Number  
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Place of search <b>MUNICH</b>		Date of completion of the search <b>1 December 2000</b>	Examiner <b>Schoeyer, M</b>
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  O : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  L : document cited for other reasons  &amp; : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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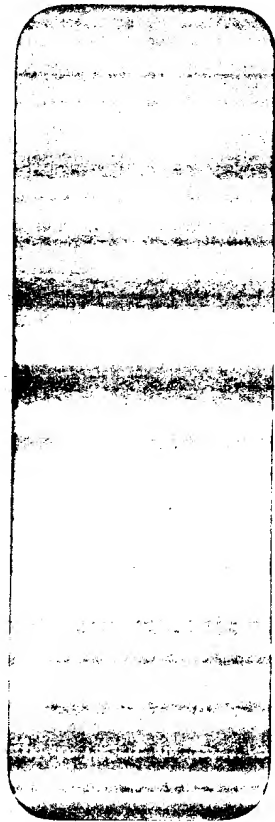
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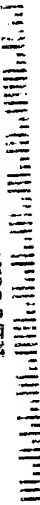
OFFICIAL BUSINESS  
PENALTY FOR PRIVATE USE, \$300

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BAKE751 553373014 1005 03 01/13/07  
FORWARD TIME EXE RTN TO SIND  
:R C BAKER & ASSOCIATES LTD  
8930 HUNTERS WAY  
APPLE VALLEY MN 55124-9492

RETURN TO SENDER



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